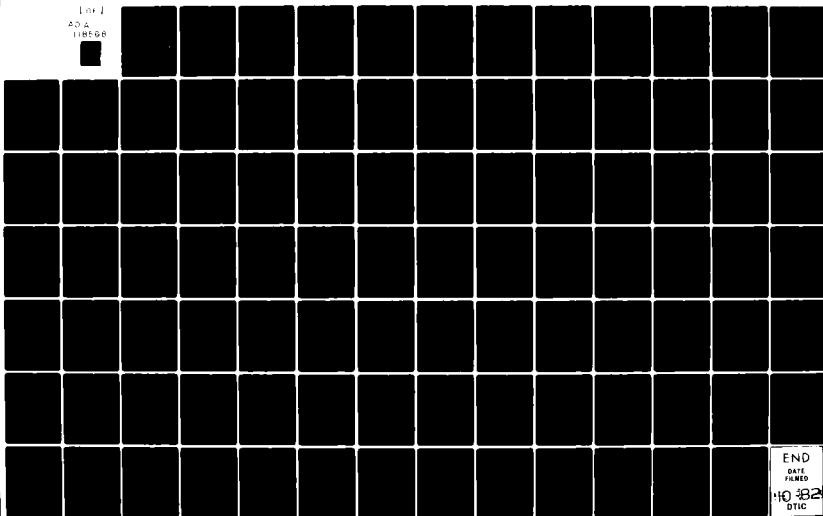


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**CULTURAL RESOURCES SURVEY OF SIX REVETMENT
AND LEVEE ITEMS ABOVE NEW ORLEANS**

Iroquois Research Institute
P. O. Box 2307
Fairfax, Va. 22031-0307

20 January 1982

Final Report

DTIC FILE COPY

Prepared for
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, La. 70160

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INTRODUCTION

Scope of the Study

Iroquois Research Institute, under contract with the United States Army Corps of Engineers, New Orleans District, conducted an intensive cultural resources survey at six locations along the Mississippi River in southern Louisiana. The surveys were completed for Work Packets Two and Three of Contract No. DACW29-80-D-0107, entitled "Miscellaneous Cultural Resources Investigations within the New Orleans District." Work Packet Two includes the following items:

1. Marchand Revetment M-181-L, Levee Stations 2460+00 to 2480+00 and 2537+00 to 2552+00, Ascension Parish.
2. Convent Levee Enlargement M-163-L to M-157-L, Levee Stations 3546+00 to 3678+00 and 3707+30 to 3724+35, St. James Parish.
3. Willow Bend Revetment M-141-R, Levee Stations 1826+00 to 1876+00, St. John the Baptist Parish.

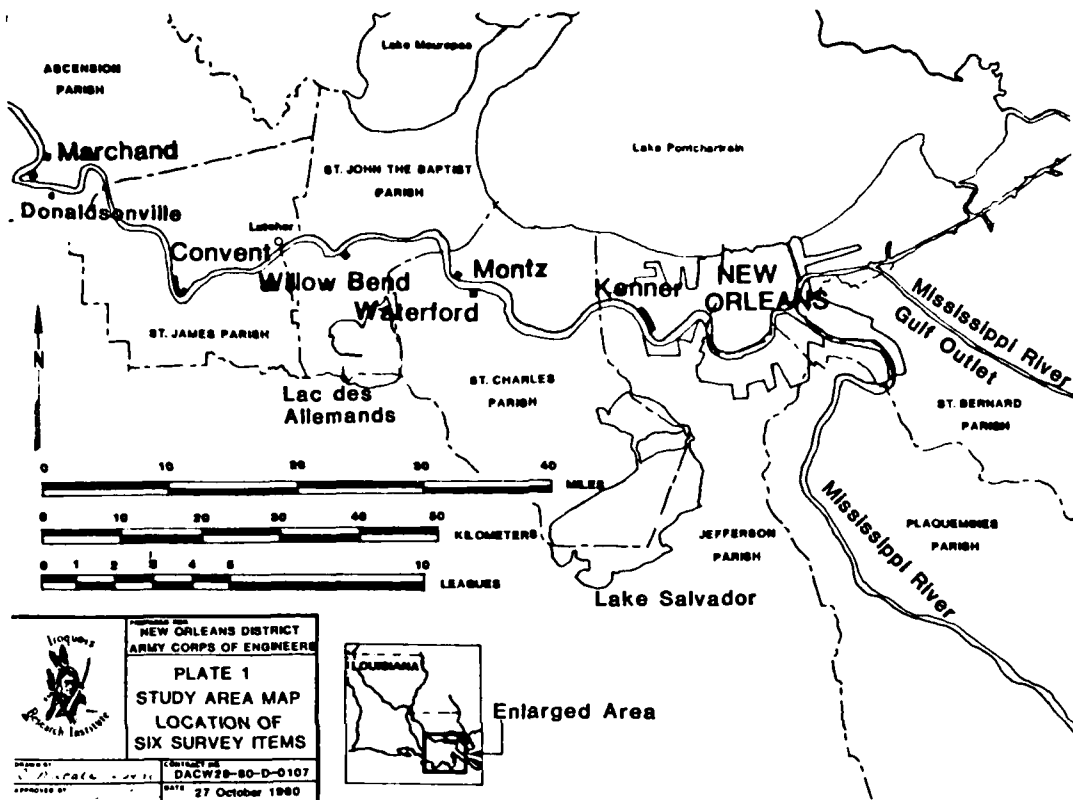
Work Packet Three includes:

1. Montz Revetment M-129.5L, Levee Station 5224+79 to 5236+79, St. Charles Parish.
2. Waterford Revetment M-128-R, Levee Stations 2521+00 to 2561+00, St. Charles Parish.
3. Kenner Revetment M-113-L, Levee Stations 6119+00 to 6301+00, Jefferson Parish.

As shown on Plate 1, the locations of all six items included in Work Packets Two and Three are situated upriver from New Orleans between river miles 110 and 181. The United States Army Corps of Engineers plans to construct concrete revetments at Marchand, Willow Bend, Montz, Waterford, and Kenner. At Convent, engineering plans call for the enlargement of the existing levee and the excavation of a borrow area. At all six items, the archeological survey was conducted in the batture between the riverside toe of the existing levee and the river bank.

These surveys were carried out as required by the National Environmental Policy Act of 1969, Public Law 91-190; "Protection and Enhancement of the Cultural Environment," Executive Order 11593; the Procedures for the Protection of Historic and Cultural Properties, 36 C.F.R. 800; and the National Historic Preservation Act of 1966, Public Law 89-665.

PLATE 1



The level of investigation for this project is defined as an "intensive cultural resources survey for the purpose of locating historic and prehistoric cultural remains, and assessing their significance" (Contract No. DACW29-80-D-0107). To achieve this objective Iroquois Research Institute performed an intensive archeological and historical literature and records review and a systematic archeological field survey of the right-of-way of each item. An intensive survey usually incorporates some form of subsurface testing if necessary (36CFR64:Appendix B). Except to determine the extent and depth of cultural resources, Iroquois Research Institute did not utilize subsurface testing procedures while surveying Work Packets 2 and 3. Two reasons accounted for this decision. First, since overbank sedimentary deposition along the Mississippi River is very rapid, thirty-centimeter deep shovel tests would not be effective for discovering remains that, if older than fifty years, would be deeply buried. Second, all the study areas occur in very highly disturbed areas, particularly the batture zones where levee and revetment construction has severely disturbed surficially occurring cultural remains. Archeological and historical remains found

during the survey have been evaluated to determine the significance of any cultural property for the National Register of Historic Places using the criteria promulgated by Federal regulation 36 C.F.R. part 60.6.

Research Objectives

The kinds of research questions asked in conjunction with a particular cultural resource management project depend on the scope of a project and on the state of knowledge of the particular project area. The primary objectives of this project are: (1) to locate and inventory the cultural resources within the areas that may be affected by the project, (2) to evaluate the identified resources with respect to their eligibility for inclusion in the National Register of Historic Places, and (3) to make recommendations for further investigations or mitigation of adverse project impacts on resources assessed to be potentially eligible for inclusion in the National Register of Historic Places.

The geographical focus of the project was the Mississippi River batture. To adequately interpret cultural resources discovered in the batture, it was necessary to assess the geomorphological history of the general study area, to determine the specific fluvial processes likely to affect each individual survey item, and to outline a regional prehistoric and historic framework for the battures and adjacent areas.

Disposition of Background Data

In addition to this technical report, cultural resource data gathered during Iroquois Research Institute's survey of the items in Work Packets Two and Three have been submitted as a separate appendix to the United States Army Corps of Engineers. This material includes (1) maps showing the location of the cultural resources identified within each item, (2) completed site survey forms used during the field investigations, and (3) detailed summaries of specific survey information within each item. This specific information has been deleted from the technical report in order to avoid the possibility of vandalism to the identified cultural resources.

Organization of the Bibliography

The bibliography of this report is organized under two headings: References Cited and Sources Consulted. The References Cited section lists all books, periodicals, maps, interviews, and other sources of information that are actually cited in the text. The Sources Consulted section lists any additional reference materials, maps, and informants that were consulted for the preparation of this report but are not cited in the body of the text.

BACKGROUND STUDIES

Environmental Setting

Southern Louisiana lies within the Humid Subtropical climatic zone. The low relief throughout the area produces little variation in the regional climate, and local microclimates are generally absent. The area is situated between two major global climatic controls: the Southern North-Atlantic Ocean Anticyclone and the Middle Latitude Cyclone. The interplay between these two systems produces extremely variable weather patterns. Throughout most of the year, the region is dominated by southerly flows of warm moist air, creating a generally warm and humid climate. Because of the absence of significant terrain barriers, however, surges of cold air which occasionally penetrate the region in winter are associated with middle latitude cyclonic patterns (Lower Mississippi Region Comprehensive Study Coordinating Committee 1974).

The following climatic data from the New Orleans Moisant Airport station offer long term records that best characterize the general study area (Lower Mississippi River Comprehensive Study Coordinating Committee 1974).

During the recording period of 1931-1960, the average annual precipitation is 136.9 centimeters or 53.9 inches. The monthly high occurs in July, with an average of 17.1 centimeters or 6.72 inches of precipitation. The lowest amount of precipitation occurs in October, averaging only 7.2 centimeters or 2.84 inches. With extremely rare exceptions, all precipitation falls as rain. Freezing precipitation is quite uncommon in southern Louisiana.

The mean annual temperature for the recorded period is 20.3 degrees Celsius or 68.6 degrees Fahrenheit. August, with a mean temperature of 27.7 degrees Celsius or 81.9 degrees Fahrenheit, is the warmest month of the year and January the coldest with a mean temperature of 12.5 degrees Celsius or 54.6 degrees Fahrenheit. The average date for the first freezing temperatures of the year is December 10th, and the last freeze occurs on February 18th. The average freeze-free growing season is 295 days.

In the general study area local plant and animal communities are strongly influenced by the age and specific characteristics of sediment making up the meander belts of the Mississippi River at specific localities. On a regional basis the entire study area falls within the Oak-Gum-Cypress Forest ecosystem. This is primarily a Mississippi Alluvial Valley ecosystem affected to a greater extent by hydrological and geophysical conditions than by climatological factors.

Most study areas actually differ considerably from the ideal Oak-Gum-Cypress Forest which itself is only a climax forest associated with the sediment and hydrological cycle of relatively stable areas away from

the active course of the river. True Oak-Gum-Cypress Forests are more characteristic of nearby backswamp areas than of the recent levee and point bar deposits within the study area.

From the time when a sedimentary deposit along the Mississippi first becomes a terrestrial habitat until it eventually reaches some climax condition more or less in equilibrium, the vegetation undergoes successive developmental stages (Shelford 1963). Initially, new point bars are colonized by sandbar willows along with several herbaceous species. Subsequent stages are transitional cottonwood-willow, sugarberry-elm-sweetgum forest, and eventually a mature floodplain forest on higher levee positions if flooding is infrequent and of short duration.

The floodplain forest associated with natural levees may have a large number of tree species as sub-dominants. Among the tree species present are oaks, including water and live oak, boxelder, cottonwood, and elm. Climbing vines and many herbs are also common components of this forest.

Fresh water marshes and cypress swamps do not generally occur within the immediate survey area, but are limited to backswamp subsidence locales away from the active river channel. These environments support a wide variety of terrestrial and aquatic resources, however, and have played a significant role in regional ecology and cultural adaptation of the area.

Terrestrial animal species inhabiting the Lower Mississippi Valley during the early historic period probably included black bear, puma, several varieties of deer, cottontail and swamp rabbit, opossum, raccoon, muskrat, bobcat, skunks and bats (Shelford 1963). Fresh and saltwater marshes of coastal Louisiana are the seasonal homes of one of the largest concentrations of migratory waterfowl in the world, in addition to being the regular home of a wide variety of local bird species (Shelford 1963). Significant local reptilian species include the American alligator and water moccasin. A wide variety of fish and mussels occur in the general study area, often adapted to very narrow salinity variations. Fish and mussels have been a significant resource for human inhabitants of the Lower Mississippi Valley and Delta throughout the period of man's occupancy in the region (Davis et al. 1979).

Prehistoric Environments

The Deltaic Plain of the Mississippi River in the area included in this study is probably the youngest land mass of comparable size in North America. Because of the youthfulness of the land it has evolved within a time period having essentially the same climatic characteristics as exist today. Although the great Pleistocene glaciations are directly responsible for the physical existence and character of the land, it has not been influenced by cyclical glacial period climatic changes nor has it supported a flora and fauna significantly different than that which existed at the beginning of the historic period.

The geological and geomorphological evolution and characteristics of the environment will be discussed in the following section. The same processes which are still shaping the land began about 5,000 years ago

subsequent to the last major glaciation when sea level reached its approximate present level (Saucier 1974:13). During this entire time period the Mississippi River had completed several repetitive and predictable cycles of delta building, with each successive land surface supporting a flora and fauna similar to previous and subsequent land surfaces at similar elevations. The succession of habitable land surfaces was without doubt a significant aspect of the environment for prehistoric peoples, as it is for the inhabitants of today.

In as far as extrapolations which can be made from the modern environment to the prehistoric, the best starting point is the early part of the historic period. This is because of the great man-made environmental changes occurring in the historic period. Examples of such changes include widespread deforestation, large scale intensive agriculture, levee and canal building and industrial activities. Few, if any, natural undisturbed levees exist along the Mississippi River from which to extrapolate prehistoric levee conditions.

There are, however, quite good records from the earliest part of the historic period to indicate the relative abundance and importance of different plant and animal species in local prehistoric economies. A number of authors have provided extensive accounts of species known to have been utilized by the aboriginal peoples during that period (McIntire 1958:31-49; Davis et al. 1979:16-22). The latter reference concentrates especially on the aquatic and marsh flora and fauna.

With the exception of large animals such as wolf, cougar and bison which have become rare or extinct in southeastern Louisiana, most prehistoric flora and fauna species are still present to some degree, but in much fewer numbers or lower densities and only in some of their original habitats. A few exotic animals such as the nutria and European house sparrow have been added to the indigenous fauna and many exotic plant species have been introduced both accidentally and purposefully.

Because of the relatively young age of land surfaces and the relative stability of the climate over the likely period of potential human occupation, it is relatively simple to project that a given spot would have had one of several predictable past environments. These environments have been defined by Wiseman et al. (1979:4-15) according to definable biotic zones which exist in the modern environment. These zones are Natural Levee, Freshwater Swamp, Freshwater Marsh, Brackish Marsh and Saline Marsh. These authors did not specifically describe the biota of the natural or man-made batture but did describe two human created zones resulting from dredging activities.

Two of these biotic zones, the Natural Levee and the Freshwater Swamp, supported trees with an associated flora and fauna. The Natural Levee zone contained the greatest diversity of resources such as acorns from live oak (Quercus virginiana) and willow oak (Quercus phellos), nuts from bitter pecan (Carya aquatica) and pecan (Carya illinoensis), fruits from persimmon (Diospyros virginiana) and mulberry (Morus rubra) and edible roots from greenbriar (Smilax sp) and wild potato (Ipomea pandurata). Mammals on the Natural Levee included deer, opossum, raccoon, rabbit and squirrels.

In the Freshwater Swamp the principal trees were cypress (Taxodium distichum), tupelo gum (Nyssa aquatica) and maple (Acer rubrum Var. drummondii). The principal animals were amphibians and aquatic life including water snakes and alligators. Waterfowl were abundant here and in the Brackish Marsh.

The Freshwater Marsh usually had a high proportion of cattail (Typha latifolia) mixed with grasses such as common reed (Phragmites communis) and water millet (Zizaniopsis miliacea). Freshwater and brackish marshes were habitats for a large variety of turtles, frogs, reptiles, migratory waterfowl, and invertebrates such as crayfish and clams. The Brackish Marsh had many plant species but was dominated by couch grass (Spartina patens) and black rush (Juncus roemerianus). Fauna in the brackish as well as Freshwater Marsh included muskrat (Onychia zibethicus), otter (Lutra canadensis) and several species of fish, clams and migratory waterfowl. Of great importance in both the past and present local economies were the shellfish, primarily the brackish water clam (Rangia cuneata) and oyster (Crassostrea virginica; Wiseman et al. 1979:2-15).

For specific survey areas along the Mississippi River batture it is not possible, without elaborate paleoenvironmental field and laboratory analyses, to identify the area's prehistoric environment. Where relatively recent point bar deposits are present the effort would not be warranted since such areas have little potential for containing in situ prehistoric cultural materials.

For those areas of batture which cannot be defined as recent point bars from actual historic records, we may make somewhat more reasoned judgments regarding their most recent environmental setting, that is their last environment prior to becoming a batture. Since the present, largely man-made, battures are quite variable, these areas collectively do not fit into any single previously defined biotic zone or other natural environmental strata.

Geomorphology of the Study Area

The Mississippi River Alluvial Valley is an important subdivision of the Gulf Coastal Plain. It extends upstream to just north of Cairo, Illinois, a distance of approximately 600 miles. The Alluvial Valley has a width that varies between 50 to 100 miles and it is divisible into five basins: Atchafalaya, Tensas, Yazoo, St. Francis, and Black Rivers. The Alluvial Valley slopes gently to the Gulf and is usually bounded on both sides by abrupt escarpments or bluffs.

The Alluvial Valley has had a complex origin and can be characterized as a valley within a valley. The present valley was formed during the Wisconsin stage of the Pleistocene glaciation. At the maximum lowering of sea level during the Wisconsin glacial advance, the ancestral Mississippi

River had incised deeply into the older coastal plain sediments. This entrenched valley was partially filled with glacially derived sediments as sea level slowly rose at the end of the Pleistocene. The landward thinning wedge of sediments buried the erosional unconformities and filled the valley. These sediments grade from coarser-sized material at the base to finer-sized material at the top.

The materials overlying the glacially derived sediments were deposited during the period of sea level stability after the last Wisconsin advance. Their composition and internal structures indicate a general progradation of the shoreline resulting from the development of the Deltaic Plain.

The Mississippi River's deltaic plain is considered a separate geological unit defined by the presence of deltaic marine deposits. Fisk (1944) separates the Alluvial Valley from the Deltaic Plain along a northeast-southwest boundary line drawn between Franklin and Donaldsonville, Louisiana. Krinitzksy and Smith (1969) and Saucier (1974) suggest that this boundary be moved approximately 20 miles to the southeast of Fisk's line. According to Fisk's (1944) definition, all of the survey items within Work Packets 2 and 3 are located within the Deltaic Plain. On the other hand, according to Saucier's (1974) geomorphological demarcation, the northernmost Marchand Revetment would lie within the Alluvial Valley and not the Deltaic Plain.

The Deltaic Plain is the composite result of several progradations of the Mississippi River. Frazier (1967) states that the development of a typical delta complex occurs by the cyclical interaction of progradation, distributary abandonment and transgression.

Studies of sediment cores, primarily their lithology, floral and faunal assemblages, and radiocarbon dating, have enabled five distinct deltaic lobe complexes to be differentiated. From oldest to youngest, these are: Maringouin, Teche, St. Bernard, La Fourche, and Plaquemines-Modern Delta Complexes. Each of the five major complexes is related to a major Mississippi River course. Sixteen separate delta lobes have been formed by the Mississippi River during the past 6,000 years. Each of the individual deltaic lobes within a particular complex is a result of the shifts of distributary networks of one of the major river courses.

Each successive lobe may or may not be deposited directly upon the older underlying lobe, depending upon the direction and amount of shift in the distributary network. Frazier (1967) has shown that the region between Donaldsonville and New Orleans is characterized by a complete section of sediments of St. Bernard Deltaic Lobes 3, 5, 7, 8, 9, and 11 with a surficial covering of sediments of Plaquemines-Modern Deltaic Lobes 13 and 16. The lower the number, the older the lobe. The chronology of delta lobes of the St. Bernard and Plaquemines-Modern Deltaic Complexes found between Donaldsonville and New Orleans are presented in Table 1.

The first major eastward progradation of the ancestral Mississippi River produced Deltaic Lobe 3 of the St. Bernard Delta Complex. The river passed eastward from Donaldsonville through New Orleans. During the interval from approximately 4,700 B.P. to present, extensive natural

TABLE 1

CHRONOLOGY OF EXPOSED AND BURIED
ST. BERNARD AND PLAQUEMINES-MODERN DELTAIC LOBES
PRESENT IN THE STUDY AREA

<u>Delta Complex</u>	<u>Lobe</u>	<u>Age in Years Before Present</u>
Plaquemines-Modern	16	200-0
	13	950-0
St. Bernard	11	1800-1600
	9	2400-1750
	8	3000-2300
	7	2400-2000
	5	4050-3500
	3	4700-4600

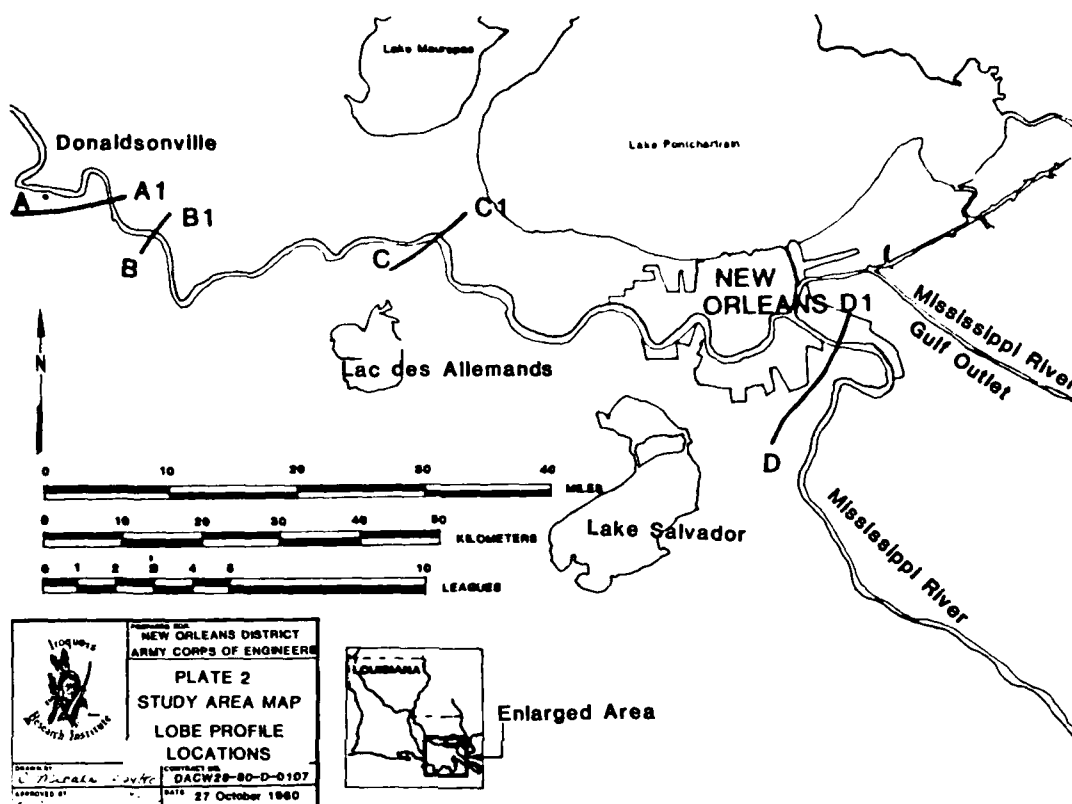
Source: Frazier (1967) Fig. 12, p. 308

levees developed along the banks of the Mississippi River between Donaldsonville and New Orleans. Subsequently Deltaic Lobes 5, 7, 8, 9, and 11 were deposited along this established river course. The successively younger lobes were prograded eastward.

Diversion of some of the Mississippi River flow created the first three lobes of the La Fourche Delta Complex during the period 3,500 to 1,100 B.P. By approximately 800 B.P., a major diversion of water from the ancestral river occurred, producing Deltaic Lobe 14. By approximately 1,000 B.P. some river flow had again returned to the ancestral channel associated with the St. Bernard Delta, producing Lobe 13 of the Plaquemine-Modern Delta Complex. The youngest deltaic lobe of the Plaquemines-Modern sequence, No. 16, has been deposited on top of older units during the past 200 years.

Frazier (1967) gives five cross sections of the delta indicating the location of borings used to determine delta lobe and facies relationships. Four of these profiles are within the study area and are discussed in detail below. These are cross sections A, B, C, and D. Location of specific portions of profiles discussed is shown in Plate 2.

PLATE 2



Profile A-A' passes just south of Donaldsonville and the Marchand Revetment area. It begins on the right bank and crosses the Mississippi River between the Marchand and Convent areas. Profile B-B' crosses the Mississippi River a few miles to the southeast of profile A-A'. It lies closer to the Convent site. Profile C-C' lies about an equal distance between the Willow Bend area to the west and the Montz and Waterford sites to the southeast. Profiles C-C' and D-D' lie approximately 16 miles from the Kenner Revetment.

A portion of cross section A-A' is located approximately two miles south of the Marchand site in the vicinity of Mile 57 (Frazier 1967). While facies relationships are shown to change greatly in short horizontal distances just west of this area, we can reasonably expect that the same progradational facies will be represented at Marchand, although probably lying at different depths and perhaps being bounded by different facies than on this profile.

Since the Marchand area lies on the left bank of the present Mississippi River Valley and is close to the northern or left valley wall of the Pleistocene River, we may reasonably expect to have the sediments at this item represent those of the St. Bernard Delta Complex, possibly some or all of Deltaic Lobes 3, 5, 7, 8, 9, and 11 as well as a veneer of

recent Mississippi River levee deposits and borrow materials placed there by human activity. The entire sequence at Marchand appears to represent progradational facies including prodelta silty clays, delta front silty sand and silty clay and distributary mouthbar silty sands. Unlike profiles B-B' and C-C', delta lobe relationships have not been assigned at profile A-A'. However, extrapolation of the relationships shown in profile B-B' at the intersection with A-A' (Frazier 1967) indicate that most of the St. Bernard lobes 3, 5, 7, 8, 9, and 11 are represented at Marchand, as well as Lobes 13 and 16 of the Plaquemines-Modern Complex.

The range of expected occupation should, therefore, be approximately 4,700 years B.P. to present with more expectation for the presence of material from the last 1,000 years or younger at or just below the surface. A limiting factor for recovery of deeply buried older materials at Marchand is the thickness of sediments on the top of the buried, weathered, and eroded Pleistocene surface.

Since the Mississippi River has meandered continuously and irregularly during the last 4,700 years and the specific locations of the meandering river are not known with any great accuracy until 19th century mapping, the chances of recovering prehistoric materials at or near the surface are not thought to be high.

Profiles B-B' and C-C' indicate that the Convent, Willow Bend, Montz and Waterford areas all are characterized by the same delta lobe relationships as seen in profile A-A'. However, the facies relationships show that north and south of the present river lower Deltaic Plain deposits, including peats, inorganic clays, clayey peats, peaty clay and organic muck, are present. The same arguments hold for the expected age of prehistoric and historic occupation at these four areas as they did for Marchand. Expected maximum range of occupation would be 4,700 B.P. to present with the actual age depending upon location of each site with respect to the active Mississippi River channel and the depth of the site below present ground level.

The Kenner Revetment lies midway between profiles C-C' and D-D'. Displacement of the preserved levee-channel-levee contacts of the older individual deltaic lobes of the St. Bernard Deltaic Complex beneath the present Mississippi River channel on profiles C-C' and D-D' suggests a southward migration of the channel axis by as much as a mile. This migration occurred during the last 4,000 years in the vicinity of C-C', while on D-D' a time frame of approximately 3,500 years is suggested. As the Mississippi River is traversed from Waterford to Kenner, the thickness of the Plaquemines-Modern deltaic lobe deposits capping the present levee system increases. This strongly suggests that material older than 1,000 years B.P. would not be generally exposed at the surface, except under circumstances where lateral migration and accompanying erosion of younger deposits had occurred. Older depositional units exposed in this manner would still lie beneath a veneer of recent sediment.

In conjunction with knowledge of the general geomorphological history of the study area, limited detailed information exists to assess the specific fluvial and sedimentological processes that affect the potential occurrence of cultural resources at each individual survey item.

Marchand Revetment

The Marchand Revetment comprises two separate areas located in Ascension Parish. Both areas lie on the left bank of the Mississippi River opposite Philadelphia Point, which is a right hand bend of the river. The region occupied by the northern revetment is a zone of active erosion associated with the outside bend of this meander. The second area lies just downstream, but north of 81 Mile Point, which is a left hand meander. This second area appears also to have been subjected to intensive recent erosion. Plate 2 of Long (1965) indicates that the older point bar deposits at the northern area have been totally removed by erosion, while the southern site lies in an area where some point bar deposits remain.

The position of the 1830 meander line shown on the White Castle and Donaldsonville quadrangle maps (1963, 1965) indicates that the meanders have migrated approximately one mile during the ensuing 150 year interval. This migration will continue until a cutoff is established at 81 Mile Point. The surface deposits were generated by the recent Mississippi River. The subsurface deposits are associated with the ancestral Mississippi River flowing across the St. Bernard Deltaic Complex. Previous occupations of up to 4,700 B.P. may exist at depths of up to 20 to 30 feet, but are in the process of being destroyed by the present migration of the left bank of the Mississippi River. Historic sites of the interval 1830 to present are likewise being destroyed by erosion on the left bank. Historic sites prior to 1830 may or may not be present or preserved depending upon the location of previous meanders, which at this time are unknown.

Convent Levee Enlargement

The Convent Levee Enlargement lies on the left bank of the Mississippi River just south of a right-hand bend. It extends around College Point, a sharp left-hand bend, which is a zone of active sedimentation, as it is a point bar.

The axis of the 1849-1850 Mississippi River meander belt line coincides with the present left bank shore line. This means that depositional processes have built the riverbank outward and that older deposits, if present, are presently being buried and preserved.

Willow Bend Revetment

The Willow Bend Revetment lies on the right bank of the Mississippi River between a left and right hand meander. It appears to be an area of active erosion.

Recent historical activity of the Mississippi River would suggest moderate erosion and removal of older deposits in this location as the river has shifted toward the south by meandering.

Montz Revetment

The Montz Revetment is located on the left bank of the Mississippi River at 35 Mile Point on the inner or left bank of a left hand meander. This is an area of active point bar deposition (Hosman 1972) and should have conditions similar to the Convent Levee Enlargement.

Waterford Revetment

The Waterford Revetment lies on the right bank of the Mississippi River just downstream and opposite of the Montz Revetment. This is an area of erosion and general southward migration of the meander belt. Hosman (1972) suggests that Mississippi River point bar deposits have been almost totally removed by subsequent erosion. Historic and prehistoric sites may not be preserved in this area.

Kenner Revetment

The Kenner Revetment lies on the left bank between a right and left hand meander of the Mississippi River. It is a zone of active erosion and eastward movement of the meander belt. Erosional activity here would be similar to, but not as severe, as at the Marchand Revetment. One difference is the greater thickness of recent deltaic and levee deposits at Kenner than at Marchand. Therefore, materials older than 1,000 years B.P. would probably not be observed at Kenner except at depths in excess of 10 to 20 feet.

PREHISTORIC AND HISTORIC BACKGROUND RESEARCH

Methodology

This project involved considerable historic and archeological background research of archival sources, local histories, secondary accounts, primary research reports, and original historic sources. An attempt was made to focus upon data relevant to batture zones. Historic accounts, however, rarely described activities or structures located specifically within those areas. Maps, if of a large enough scale, provided the best information on battures. Nevertheless, the cartographic review, as explained below, yielded negative results. Given the paucity of documentary evidence, the historic background study concentrated on areas contiguous or adjacent to the survey items.

Research was conducted at the Tulane University Howard Tilton Memorial Library, Louisiana Collection and Special Collections Department; the University of New Orleans Library and Anthropology Department; the New Orleans Public Library Louisiana Collection; the Curatorial Department of the Louisiana State Museum, New Orleans; the Historic New Orleans Collection; Loyola University, New Orleans; and Louisiana's State Office of Archaeology and Historic Preservation, Baton Rouge.

Documents from the French occupation of Louisiana available on microfilm at Loyola University in New Orleans and the Library of Congress in Washington, D.C. were helpful. Local history tracts were largely obtained at the Local History and Genealogy Division of the Library of Congress.

Map data were obtained largely at the Tulane University Library; the Bureau of Land Management in Alexandria, Virginia; the U.S. Army Corps of Engineers, New Orleans District; the U.S. Geological Survey in Reston, Virginia, and the Cartographic Department of the National Archives in Washington, D.C. In one case clarification related to a primary document was obtained directly from the Archives Nationales, Paris. A review of historic maps, performed to locate cultural resources within the study areas, had largely negative results. The cartographic review and pertinent map data are presented in Appendix A.

Local informants and regional specialists in the fields of history, architecture, and archeology were also consulted as part of the background research for this report. A complete list of informants and specialists interviewed by Iroquois Research Institute is contained in the Sources Consulted section of the Bibliography.

Prehistoric Cultural Developments in the Study Vicinity

The prehistory of the eastern United States can be divided into three broad developmental stages. These are the Lithic stage, the Archaic stage and the Formative stage. Muller (1978) suggests the following period names for the region of the southeast:

Paleo-Indian	ca. 10,000 B.C. - 6,000 B.C.
Archaic	6,000 B.C. - 700 B.C.
Sedentary	700 B.C. - A.D. 700
Late Prehistoric	A.D. 700 - A.D. 1540

These periods can be used to characterize the entire cultural sequence of the southeastern United States and have been further refined at the local level.

The earliest evidence of man's occupation of the New World has been grouped into a period postulated by Krieger (1964) as the Preprojectile Point stage or the Chopper-Scraper stage. This stage is reputedly characterized by large crude percussion-flaked tools that possibly represent an ancient substratum for later technological developments in North America. The sites associated with the Preprojectile Point stage are poorly dated and the evidence for this stage is tentative at this point.

The earliest well documented stage in the Southeast is the Paleo-Indian period. This period is distinguished by lanceolate projectile points such as Clovis, Folsom, and Dalton points. On the Plains where the stage is clearly identified, the economy was oriented towards big game hunting and social organization was characterized by small migratory groups. In the Southeast, the social organization was probably comparable, but settlement was apparently oriented more toward river valley (Muller 1978; Byrd and Neuman 1978).

Almost exclusively the discoveries of Paleo-Indian activities in southern Louisiana outside of the delta complex have been in the form of isolated finds on the natural river levees and Pleistocene terraces. One exception has occurred at Avery Island where a subsurface Paleo-Indian component containing stone, bone, and wooden artifacts has been found near but not in definite association with Pleistocene fauna (Gagliano 1967). Another Paleo-Indian occupation has been reported at the Vatican site in southcentral Louisiana (Gibson and Servello n.d.). The number of people living in southern Louisiana during the Paleo-Indian period was probably small. Environmental changes at the end of the Pleistocene encouraged a change in the economy and settlement patterns that led to the Archaic stage.

The Archaic stage exhibits distinct cultural variations that are probably responses to local environmental conditions. An efficient broad-based economy based on hunting, gathering, and fishing developed, as well as a more complex technology as reflected in the artifact

inventory (Caldwell 1958). Artifacts include chipped and ground stone tools, atlatls, grinding stones, fishhooks, and various projectile points. The large number of shell middens along the Louisiana coast illustrates the importance of shellfish gathering as a basis for subsistence.

Several local Archaic phases have been identified in Louisiana almost solely on the basis of projectile point typologies. However, these phases, like the Archaic stage in general, remain poorly understood in Louisiana (Iroquois Research Institute 1981).

The distinction between the late Archaic and early Sedentary cultures is not as clear cut as the stage demarcations would imply. The Poverty Point complex is a culture which exhibits characteristics of both, since it represents a continuation of patterns begun during the Archaic but with a number of innovations. Technological changes are evident such as microliths, baked clay balls, unique projectile points, steatite bowls and fiber tempered pottery.

Characteristic of this culture was the construction of large earthworks and mounds which imply greater sedentism and more complex social organization. Long distance trading networks developed within the Poverty Point period and items exchanged include steatite, copper, quartz, and galena. This level of cultural complexity has been hypothesized to have been the result of the introduction of maize agriculture (Ford 1969; Webb 1968), since a stable productive economy is usually thought necessary for this type of organization. There is a lack of evidence for the existence of agriculture, however, in Poverty Point contexts. It seems more likely that diversified exploitation of the abundant natural resources present in the area was adequate to support this social complexity (Brain 1971).

The Poverty Point culture was centered north of the study area near Epps, Louisiana. One Poverty Point site is presently known in the vicinity of the study area, the Bayou Jasmine site in St. John the Baptist Parish. This site has a Poverty Point as well as later prehistoric and historic components.

Richard I. Ford (1974) has suggested a model for a non-agricultural society requiring complex social organization that might be applied to the Poverty Point culture. He suggests that complex social status differences may have developed to insure exchange that would allow relatively permanent settlement and dense population despite the variability in production of wild foods within an area from year to year.

Characteristics of the Sedentary stage include the development of surface-textured pottery, sedentary lifestyles, more complex social organization, and the probable incorporation of agriculture into the economy. In coastal Louisiana, it is evident that environmental conditions inhibited the extent to which a fully Sedentary adaptation could develop. The initial Sedentary period within southern Louisiana is known as the Tchefuncte period. This period extends roughly from 550 B.C. to A.D. 100 and is characterized by an economy based largely on hunting,

fishing and gathering. An innovation which becomes widespread during this period is grog or vegetal tempered pottery with poorly compacted paste. Pottery with plain surfaces is most common but decorated pottery also occurs with designs in curvilinear or geometric motifs.

The Tchefuncte artifact inventory includes tubular clay pipes, cut canine teeth, shell gouges, bone and antler tools, conch shell containers, and balls or cylinders of fired clay (Ford and Quimby 1945). Tchefuncte sites are noted by shell middens and small conical mounds and the majority of known sites are on old lakeshore beaches of Lake Pontchartrain and on the chenier plain around Grand Lake.

The Marksville period (100 B.C. - A.D. 300) is a local southeastern manifestation of the Hopewell interaction sphere (Caldwell 1964) that influenced much of eastern North America from circa 100 B.C. to A.D. 500. Trade networks were very widespread and materials exchanged included mica, copper and galena artifacts. Unique artifacts attributed to this period are ear spools, platform pipes and elaborate ceramic decoration, such as zoned rocker stamping, curvilinear motifs and effigy figures. The culture seems to revolve around extensive burial complexes like those at the Marksville site in Avoyelles Parish and the Crooks sites in LaSalle Parish. Differences are evident in southeastern Louisiana where large complexes are absent and sites of the period consist of isolated burial mounds and middens. Sites with Marksville components in the area are the Gibson site in Terrebonne Parish and Coquelle in Jefferson Parish.

The Baytown period (A.D. 300 - A.D. 700) which follows Marksville is a transitional period between Marksville and Coles Creek. Many of the same traits are evident in Baytown and Coles Creek such as truncated pyramidal earth mounds and new pottery types, and they may be considered to be developmental continuum.

Shell middens and mounds are characteristic of the Baytown period. The economic basis of this period is not clear. One hypothesis is that the mound complexes were ceremonial centers for surrounding agricultural communities since they are located on crests of natural levees along the Mississippi River (Gagliano et al. 1975). Alternatively, Gibson (1978) hypothesizes that the rich and varied environment allowed communities to be supported solely by the intensive collection of natural resources.

The onset of the Coles Creek period (A.D. 700 - A.D. 1000) is marked by a drastic increase in the number of sites in southern Louisiana. Hagg (1971) interprets this as a result of population growth. It is also possible that the present evidence is misleading because earlier sites of the Baytown period may have been buried by alluviation (Davis 1977). There is some evidence of seasonal exploitation and utilization of coastal locations, such as Bruly St. Martin in Coastal Louisiana (Springer 1973), but better data are necessary for an understanding of the subsistence of the Baytown and Coles Creek periods. Coles Creek components exist at the Vacherie site in St. John the Baptist Parish and the Sims site in St. Charles Parish (Davis, personal communication).

Cultural continuity and elaboration are evident in the succeeding Plaquemine period that extends from A.D. 1000 to 1700. Quimby (1951) defined this period at the type site of Medora on the basis of traits such as plazas, truncated pyramid mounds, and different ceramic types including Plaquemine Brushed. The social and economic characteristics of the period become increasingly complex toward the latter part of the period. In the early part of the Plaquemine period, seasonal exploitation of different environments is evident with small groups congregating into large seasonal villages for the fall and winter.

Large villages located on broad natural levees are characteristic of the latter part of the period (Altshul 1978). Plaquemine components are known at the Fleming site in Jefferson Parish and at the Sims site in St. Charles Parish (Davis, personal communication). There are indications that maize was a part of the subsistence base at the Fleming site, though the evidence is tentative. McIntire (1958) suggests that there was a population decline in southern Louisiana during the Plaquemine period, but this may be a result of incomplete site data or the relatively short length of the period (Davis et al. 1979).

The Mississippian culture of the Late Prehistoric period (Muller 1978) represents the climax of cultural complexity which peaks between A.D. 1400 and 1700. Populations began to concentrate in alluvial valleys (Williams 1956) where the cultivation of maize, beans and squash formed the subsistence base. Truncated pyramidal earth mounds and ceremonial centers are characteristic of this period. The major changes in ceramics consist of the introduction of shell temper and design motifs associated with the Southeastern Ceremonial Complex (Waring and Holder 1945).

Mississippian component sites are not commonly reported from coastal Louisiana probably because of the lack of adequate farmland. However, several sites have been recorded including the Bowie site in LaFourche Parish; Avery Island; the Bayougoula site in Iberville Parish; the Fleming site in Jefferson Parish; and the Sims site in St. Charles Parish (Davis, personal communication).

Historic Development of the Study Area

This historic overview of the study area concentrates upon general trends where site specificity is lacking in the archives. From the time of the first European explorations to the present day, most of the history of this area has been associated with an agricultural society.

Although Spain conducted explorations of the Mississippi Valley in the 1500's, present-day Louisiana saw no lasting European colonization until the late 1600's. At that time Louis XIV of France was anxious to secure additional portions of the New World free of British and Spanish influence. Hence in 1682 he commissioned Robert Cavalier de la Salle to explore and claim territory in the Mississippi Valley. La Salle, who traveled south from Illinois, planted the flag for France, naming the area he explored Louisiana in honor of his king. On a return voyage from France, he subsequently founded a colony along the Gulf coast of Texas to back up the claim, mistakenly thinking the area was located at the mouth of the Mississippi River. Unfortunately, this colony did not survive hostile Indians or disease (Davis et al. 1979).

Almost twenty years elapsed before the French undertook further exploration along the Mississippi River. In 1699, Louis XIV dispatched Pierre le Moyne, Sieur d'Iberville, to chart the region. After traveling to the Gulf, stopping at Mobile Bay and Biloxi, Iberville ascended the Mississippi River. He visited the Red River confluence and returned to the mouth of the Mississippi by way of Lake Pontchartrain. His brother, Jean-Baptiste le Moyne, Sieur de Bienville, accompanied Iberville until the return voyage, at which time he chose to continue down the Mississippi River. About fifteen miles south of present-day New Orleans, Bienville encountered a party of British explorers. Explaining that France claimed the territory, Bienville convinced the English force to depart. The incident led to the designation of this place English Turn (Davis et al. 1979).

As Bienville explored the uncharted land along the Mississippi and Red Rivers, he encountered several Indian tribes. In 1699, Iberville visited the Avoyelles on the Red River as well as the Washa on Bayou La Fourche. There were several other Indian groups in southern Louisiana as well. The Chawasha Indians were found near Bayou La Fourche, along with the Chickasaws, which were located primarily between New Orleans and Natchitoches. The Tangipahoas occupied territory on the north side of Lake Pontchartrain while the Chitimachas resided between Bayou Teche and the Mississippi River (Whittington n.d.; Davis et al. 1979; Taylor 1966).

Indian groups apparently led a semi-nomadic life in southern Louisiana. They combined frequent moves with subsistence farming and hunting-gathering activities. Indian relocations were often the result

of inter-tribal warfare or contact with European settlers. For example, in 1713, the Bayogoulas Indians settled near Vacherie in present-day St. James Parish. They moved to this area because the Taensa tribe drove them from Bayou Goula (Campbell 1977).

Although many Indian groups were in Louisiana at the time of the European explorations, the present boundaries of the state probably held fewer than 15,000 Indians in the early 16th century. Contact with white settlers soon reduced this total even further. Thus, as a result of disease, warfare, and migration from the state, little more than 500 Indians remained in Louisiana by 1900 (Taylor 1966).

French fur traders and trappers followed closely behind explorers in establishing contacts with Indian villages. Entering the Mississippi Valley shortly after La Salle, they traded with Indian tribes located along the river and its tributaries. They exchanged European products for such items as furs, pelts, bear oil, and dressed deer skins. The French subsequently transported the newly-acquired merchandise to the mouth of the Mississippi for shipment to Europe (Whittington n.d.; Taylor 1966; Desmond 1970).

Although traders were present in the Lower Mississippi Valley prior to 1700, the first permanent settlements did not occur until the beginning of the new century. Bienville was primarily responsible for the settlement of the Lower Mississippi Valley. While he originally established a capital at Fort St. Louis near Mobile Bay, he realized that this location was not suitable for protecting the colony from British or Spanish encroachment. Hence, Bienville ordered land cleared around present-day New Orleans in 1718 and moved the capital there in 1721. Meanwhile, other French colonists established a settlement in 1714 in Natchitoches on the Red River (Desmond 1970; Davis 1968; Carter 1968; Hansen 1971).

The selection of New Orleans as a capital was the driving force behind the beginning of the French settlement up and down the Mississippi River. The location was critical because it allowed France to control access of the Mississippi Valley to the mouth of the river and thence, to European markets (Desmond 1970; Davis 1968; Carter 1968; Hansen 1971).

In addition to establishing New Orleans for strategic purposes, the French also constructed a string of forts up and down the Mississippi River as a way to guard against Britain and Spain. Two such forts constructed near New Orleans were Fort St. Leon and Ste. Marie at English Turn near Phoenix (Davis et al. 1979).

In addition to establishing a colony in the New World to offset British and Spanish colonization, Louis XIV initially hoped the colony would provide much needed gold and silver. When this failed to occur, the King ceded the colony in 1717 to a company directed by financier John Law. In 1719 Law reorganized the concern and entitled it the Company of the Indies. This company served as the catalyst to European settlement of present-day Louisiana. Although it went bankrupt in 1720, it continued to recruit colonists until Louisiana became a royal colony in 1731 (Stoddard 1812; Hansen 1971; Taylor 1966).

During the years the colony was controlled by the Indies Company, colonists struggled to increase their population but eked out only a meager existence. Populating the colony proved difficult; for example, in 1722 New Orleans contained a mere 200 residents (Desmond 1970). What few colonists there were faced diseases such as yellow fever or hazards such as inadequate supplies of food and other necessities. Farmers were vulnerable to unfavorable weather conditions and the Mississippi River frequently overflowed its banks and inundated agricultural land. Other natural disasters, such as a hurricane which struck the colony in 1721, destroyed much of the rice crop (Goodspeed Publishing Company 1892; Deiler 1909).

In an effort to obtain more colonists, the Indies Company granted land concessions to Europeans willing to move to the New World. The first concessions were located along the Red and Mississippi Rivers. The colonists prized this land because it provided easy access to river transportation and was rich in alluvial soil highly suited to agricultural pursuits. These front lands nearest the rivers were easily worked, even with the most primitive implements (Lockett 1969; Shugg 1939).

The settlers who obtained land grants, many of whom were former French military officers, were required to clear the land and build a house within one year and a day. They were also obliged to construct levees, or dams, to protect the land from inundation. Settlers were also expected to build a public road upon the levee and construct bridges when necessary (Stoddard 1812).

French settlers raised subsistence crops such as corn and planted cash crops like indigo and tobacco. In the southern regions of modern-day Louisiana, colonists constructed cabins from vertically-positioned logs called poteaux en terre. They then plastered over the logs and constructed a thatch roof from palmetto leaves. The floor was simply pressed earth (Kniffen 1968).

As the colonists who obtained land grants established plantations and farms along the Mississippi and Red Rivers, other Europeans began to settle the colony. Because of a stipulation in its charter, the Indies Company had to fill the colony with 6,000 settlers and 3,000 slaves within ten years. Hence, some of the colonists the company recruited were indigents, political undesirables, or ex-convicts newly-released from prison. The company often arranged marriages for these individuals prior to their debarkation from France. According to one author, the couples were "paraded through the streets of Paris, but whether to symbolize their relations or from fear of some attempt at escape, a small chain bound together each husband and wife" (Toupe n.d.)

Descendants of early French colonists were known here as elsewhere as Creoles. For the first one hundred years of Louisiana's history Creoles outnumbered Americans of Anglo-Saxon descent by two to one. As late as 1840 they predominated in the southernmost fifteen parishes (Shugg 1939).

The Indies Company also sponsored the importation of slaves. The first slave ships arrived in the colony from Africa by way of St. Domingo in 1720. In order to assure a constant supply of labor, the Indies Company outlawed the sale of slaves outside the colony (Gayarre 1919).

Since substantial amounts of slaves were needed on plantations, the slave population increased more rapidly than that of Europeans. By 1860 only the white majority in New Orleans kept the state of Louisiana from being predominately black. Outside of New Orleans, blacks comprised 71 percent of the population (Shugg 1939; Carter 1968).

In addition to the French colonists and their black slaves, German-speaking Alsatian and Lorrainians immigrated to Louisiana during the early colonial period. These people had been recruited by the Indies Company and originally settled along the Arkansas River. In 1722 they traveled to New Orleans and demanded new supplies or passage back to Europe. During a conference with Bienville, they accepted his offer to clear land about 40 miles above New Orleans. They settled primarily along the right bank of the Mississippi in an area known subsequently as "La Cote des Allemands," the coast of the Germans, and known locally as the German Coast. This region is located in present-day St. Charles and St. John the Baptist Parishes (Deiler 1909).

During the early years of colonization, the economy of French Louisiana barely supported the population. The prevailing European philosophy of mercantilism held that colonies existed solely for the benefit of the mother country. As a result, colonies often suffered from financial neglect. For example, France set the price of tobacco from Louisiana and, even though the profit to planters was narrow, the government in France denied colonists the right to sell tobacco to other European buyers. Further, while France supplied colonists with only meager amounts of supplies most of its investment was allocated to the establishment of military forts (Gayarre 1919). Although these fortifications reinforced French claims to Louisiana, they did little to stimulate the local economy (Taylor 1966; Goodspeed Publishing Company 1892).

The problem of making the colony of Louisiana a valuable asset to France was discussed in a letter dated June 1, 1757 to France from Monsieur Accaron. A copy of this dispatch from the Archives Nationales in Paris was located in the Manuscript Division, Library of Congress. It reveals that colonists were able to grow crops of value to France, such as tobacco, but complained that there were too few ships calling at Louisiana for shipment of the crop to France. Accaron also noted that indigo was in its infancy as a cash crop. He suggested that the only solution to bringing about a more profitable colony would be to convince French companies to invest more funds in Louisiana (Accaron 1757).

Louisiana was not a flourishing colony when Spain obtained a large part of the territory from France in 1762. Although New Orleans and all the French territory west of the Mississippi River were ceded to Spain that year as a result of the French and Indian War, the colony did not become one of Spain's more successful ventures. Like the French, the

Spanish viewed the colony more as a means to offset British influence in the New World than as a valuable commercial property (Whittington n.d.). As had been true of France, moreover, Spain also failed to invest extensively in the colony. Hence, the colony continued to stagnate during the Spanish period. Madrid prohibited trade between Louisiana and France or any other markets except Spain. As a result, fur trading, lumber, and indigo production had to compete for markets in Spain against the products of older Spanish colonies which generally supplied better quality goods. Consequently, the economy of Louisiana suffered (Deiler 1909; Cable 1884).

Although Spain did little to stimulate the local economy, the population of the colony increased during its control of Louisiana. Some of the first arrivals came from modern-day Nova Scotia and New Brunswick. These Acadians had been forcibly expelled by the British during the French and Indian War, or Seven Years War, of 1756 to 1763. Colonel Charles Lawrence, Lieutenant governor of Halifax, had ordered the Acadians to take an oath of allegiance to British King George II. When the French refused, Lawrence expelled all settlers regardless of sex or age and confiscated their property. As the Acadians were herded onto ships for removal from the colony, many families were separated, never to be reunited. The ships took the Acadians to widely scattered destinations, including French West Indies, England, and France. Some of the emigrants eventually arrived in Louisiana, where their French compatriots greeted them warmly (Wrong 1938). Many of today's inhabitants of St. Charles, St. James, and Ascension parishes are from this stock (Desmond 1970). Their descendants are known today as Cajuns (Hansen 1971; Campbell 1977).

Several years later Spain welcomed new arrivals from the newly-created United States. Anxious to establish a buffer between Louisiana and British Canada, the Spanish granted American settlers free sections of land and also exempted them from taxation. The Americans generally settled in the northern parishes of modern-day Louisiana and in Spanish West Florida, which was located along the east bank of the Mississippi River north of Lake Pontchartrain (Kramer 1975; Hansen 1971).

When the United States purchased the Louisiana Territory in 1803, after a brief period when Louisiana was held again by France, the territory entered an era of heretofore unknown prosperity. The port of New Orleans, now open to unrestricted American commerce, became the second largest port in the United States by 1860. The territory's transfer to the United States brought in more immigrants from other regions of the United States. Additionally, Louisiana was settled by further arrivals of Europeans. The overthrow of the monarchy in France and violent slave revolts in the West Indies led to the arrival of additional Frenchmen. Immigration from the poorer regions of Ireland and Germany contributed additional European settlers to the territory during this period (Kramer 1975; Hansen 1971).

At the beginning of the American period Louisiana was still not fully settled. The cities of New Orleans, Natchitoches, Baton Rouge, Opelousas, St. Martinsville, Lafayette, New Iberia, Monroe, and Alexandria had been established during the colonial period. Many sections of the state, however, were still largely uninhabited (Kramer 1975; Hansen 1971).

During the American period, the cultivation of sugar as a cash crop became an important aspect of Louisiana's economy. In southern parishes, sugar soon became dominant, even though cotton, planted in the northern provinces, provided more income for the state (Cable 1884; Gibson 1838). The rise of a sugar aristocracy had great effect on the cultural and economic development of Louisiana.

Initial production of sugar had begun in the French period. Jesuits in New Orleans first planted the cane from seeds obtained from St. Domingo in 1751. Sugar planting was not generally profitable, however, until the development in 1790 of a process for extracting increased amounts of sugar from raw cane. This process, developed by Etienne Bore, allowed the rapid expansion of the sugar industry. By the time of the Civil War, the southern sugar provinces of Louisiana supplied the United States with 459,410 hogsheads of sugar (Bouchereau 1869).

Sugar plantations soon proliferated along both sides of the Mississippi River. They were found from 180 miles north of New Orleans to about 60 miles south of the city. This area of rich alluvial soil proved extremely well-suited to sugar cultivation (Schmitz 1974).

Sugar plantations bore a striking resemblance to one another. Those located immediately along the Mississippi River were often constructed at right angles to the river on narrow strips of land called rangs, features easily recognized today by air travelers over the Mississippi and St. Lawrence Rivers. A levee with a road upon it was constructed inland from the riverbank (Reclus 1855). The planter's house stood behind the road. In order to protect it from periodic flooding of the river, many planters built the house on brick piers several feet above ground. Most plantation houses followed the Greek Revival style of architecture (Desmond 1970).

Plantation homes were usually two stories high with wide galleries spanning the second level. These provided respite from the oppressively hot weather. These galleries rested upon white columns called aux quatre vents. The houses were also often surrounded by oak trees which provided much-needed shade.

Behind the plantation house, planters constructed outbuildings, kitchens, and offices. The overseer's house and slave quarters, which formed either a single or double row of frame or brick cabins, were found further inland from the river (Reclus 1855; Hansen 1971).

The sugarhouse, around which the activity of the plantation centered, was usually located near the slave quarters. By 1822 most sugarhouses used steam instead of horse power. Sugarhouses almost always had long narrow chimneys. After 1840 many planters used a vacuum pan for boiling the juice instead of the open kettle of earlier days (Kniffen 1968; Schmitz 1974).

Cane fields were often arranged in squares. According to a visitor of a sugar plantation in 1855, the rows of cane resembled green magnolias (Reclus 1855). The fields were enclosed in a fence to separate the cane from uncultivated cypress groves or marshes. Finally, a road was found

usually at the back end of the plantation with ditches to drain off excess water from the field into the backswamps (Reclus 1855). Additional drainage ditches were often excavated through the cane fields to increase harvests.

By the late 19th century plantations were situated along the Mississippi River in the vicinity of all of the survey items included in this study. Trudeau, Providence, Boisblanc, and Soniat Plantations were situated on the left descending bank of the river in the general vicinity of Kenner Revetment. Willswood Plantation was located immediately across the river (Bragg 1977). Waterford plantation, near the Waterford Revetment, was located on the west or right descending bank (Bragg 1977). Wego Plantation was located near Willowbend Revetment (Bragg 1977). Uncle Sam Plantation was immediately upstream from the Convent Levee, and Willow Plantation was situated near the two items comprising Marchand Revetment.

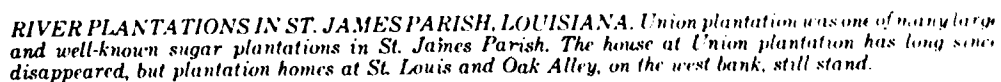
Uncle Sam Plantation, located on the left descending bank of the Mississippi River near the city of Convent in St. James Parish, provides a useful example of a typical plantation north of New Orleans within the general study vicinity. The general location of plantation properties in St. James Parish is shown on Plate 3. Built in 1842 by Pierre August Samuel Fagot, the planter's house had 28 columns and was two stories high. The plantation itself held 48 other buildings, 40 of which were slave cabins. In 1940 the abandoned plantation house and other buildings were destroyed during construction of a setback levee. The location is presently the site of a loading dock for a chemical company (Bragg 1977).

While planters concentrated primarily on the production of sugar, they also cultivated subsistence crops such as potatoes and corn. Thus they were basically self-sufficient, but planters also required supplies from other locations. They obtained these supplies in various ways. Steamboats which stopped at each plantation along the Mississippi River delivered goods from New Orleans (Schmitz 1974; Swanson 1975). Planters also obtained produce from neighboring non-slaveholding farmers. Peddlers, or colporteurs or marchands, likewise delivered supplies. Finally, planters relied upon the service of local hired workers or skilled artisans to augment the work of resident slaves. These artisans resided in small villages; Donaldsonville, near the Marchand project area, was one such example (Sitterson 1953; Shugg 1939).

Sugar plantations were economically the dominant agricultural producers of the area, but non-slaveholding farmers comprised the majority of the white population in the sugar parishes. Often of Creole, Cajun, or German descent, these farmers cultivated subsistence crops such as corn and potatoes. Most of the lots comprised fewer than 50 to 100 acres, and produced crops for the consumption of the immediate family. Any excess crops were sold to plantations or taken to New Orleans for sale in small markets (Shugg 1939).

In 1850 three out of four rural holdings in the sugar parishes were classified as farms. However, plantations contained seven times the acreage. This superiority of acreage permitted planters to assume a political and economic dominance over farmers (Shugg 1939).

River Plantations In St. James Parish, Louisiana



26

During the Civil War sugar production virtually ceased along the Mississippi River. It did not recover from the effects of the war until the late 1870's but after that time, sugar production increased rapidly. By 1890 production reached its second highest output since the introduction of sugar planting (Sitterson 1953; Goodspeed Publishing Company 1892). There were several reasons for this growth. First, although tenant farming became common after the Civil War, plantations were often not divided but instead frequently increased in size. Large corporations, with considerable assets from northern investors, consolidated holdings. Even more importantly, the industry specialized after the Civil War. Central factories, often located in New Orleans, began to manufacture sugar. This innovation separated cane cultivation from sugar production. Technological advances such as improved fertilizers and improved farm implements also modernized the industry. Finally, planters cleared more acreage for sugar production in the back lands further from the rivers (Sitterson 1953).

While blacks still comprised a large part of the work force on sugar plantations after the Civil War, planters also recruited laborers from among recent immigrants from Europe.

In addition to sugar, rice became an important cash crop in the southern parishes of Louisiana after the Civil War (Goodspeed Publishing Company 1892). Often cultivated on lands previously reserved for sugar, rice gained favor among planters because it was well suited to poorly drained soil. Workers, many of them former slaves, tapped the levees and constructed a pipe or rice flume through the levee to flood the land. They planted seeds in late March, flooded the fields, drained and dried the land, then flooded them again. After a long period of drying, workers flooded the fields again in September. They subsequently cut the rice, tied it, and stacked it to dry (Stampp 1956). Rice became an important staple in the general study area by the 1870's, but it was of greater importance south of New Orleans and in southwestern Louisiana. By the early 20th century Louisiana was the most important producer of rice in the United States (Taylor 1966).

As Louisiana entered the twentieth century, sugar began to wane as a cash crop. By 1926 the sugar parishes produced less than 50,000 tons of sugar as compared to 400,000 in 1904. The depressed state of farming in general in the United States in the 1920's exacerbated the decline of sugar plantations and throughout the decade output remained low. By 1930 more than 42 percent of all sugar farms of over 1,000 acres were no longer in cultivation. With federal assistance, sugar production saw a slow recovery in the 1930's, but the golden days of high profits were gone (Taylor 1966). As sugar production declined, plantations along the Mississippi were divided up into smaller plots or simply abandoned (Davis 1968).

Since 1945 the area surrounding New Orleans has seen substantial industrial expansion. Discoveries of salt, sulphur, natural gas, and petroleum helped in the development of industries along the Mississippi (Bridham 1972). Extensive oil refineries have been constructed along the east bank of the Mississippi in St. Charles Parish. Across the river

sugar is still produced but the region has also experienced the development of oil companies, truck farming, and commercial fishing industries (Louisiana Department of Public Works and St. Charles Parish Development Board, n.d.). Bauxite, aluminum, and chemical plants are scattered along the river from Baton Rouge to New Orleans (Davis 1968).

In spite of the industrial expansion in this area, the parishes north of New Orleans remain rural and are still sparsely populated. In 1970 the population of Ascension Parish was about 37,000; that of St. Charles about 29,000; St. James had approximately 19,000 residents, and St. John the Baptist held about 23,000. Jefferson Parish, however, which includes several major suburbs of New Orleans, contained over 338,000 inhabitants in 1970 (Louisiana Department of Public Works 1976).

Ascension Parish is one of the oldest parishes in Louisiana. Situated about 65 miles north of New Orleans along the Mississippi River, it comprises 330 square miles or 212,000 acres. It was settled originally by a colony of Acadians in 1763. The parish name comes from a Roman Catholic parochial designation. In 1807, when the State of Louisiana was divided into parishes, Ascension formed one of the original 19 political parishes (Louisiana Department of Agriculture and Immigration 1924; Goodspeed Publishing Company 1892). The parish straddles the Mississippi River, with the larger part located east of the river. Sugar cane was still the major crop in 1924. However, by that time the parish also produced rice, corn, vegetables, hay, oats, and Irish potatoes.

Several settlements within the parish are located near the Marchand Revetment item. Donaldsonville, one of the oldest cities of the entire state, was incorporated in 1813. Prior to its incorporation it had been a trading post. First settled around 1750, its first church was constructed in 1772. The town grew out of land owned by William Donaldson, a native of Britain who spoke fluent French. In 1830 the state legislature relocated to Donaldsonville but moved back to New Orleans in 1831. Many of Donaldsonville citizens today are of Acadian descent. Sugar cane and soybean fields surround the city today (Bragg 1977).

St. James Parish was settled from the inception of the French Colony by Creole plantation owners. Its alluvial soil proved very conducive to sugar production in the 1800's. The Mississippi River bisects the parish. Although sugar was an important crop in the 19th century, St. James is unique in having been a source of perique tobacco. Today, the parish also produces rice, corn and Irish potatoes.

Convent, the parish seat, is located adjacent to the Convent Levee study area. This city, named after the Convent of the Sacred Heart, was established by French nuns in 1825. At the same time, they also founded St. Michael's Church. This structure has been designated a National Historic Site. Its unique grotto was made from bagasse which is the fiber of sugar cane remaining after the juice is extracted, and shells. Today several oil refineries exist near Convent (Bragg 1977; Hansen 1971).

St. John the Baptist Parish lies between St. James and St. Charles Parishes. It is also divided by the Mississippi River. Like St. James and St. Charles Parishes, it comprised part of the German Coast settled by

John Law's Germans in the 1720's. Sugar cane was the principal crop of the parish in the 19th century. The parish also produced rice, corn, sweet and Irish potatoes in the 20th century, while oranges have become a relatively recent product.

St. Charles Parish, located on both sides of the Mississippi River a few miles above New Orleans, dates from the earliest years of French colonization. Its original settlers were Germans brought to Louisiana by John Law's Indies Company. It was also settled by Acadian exiles in 1788 (Louisiana Department of Agriculture and Immigration 1924). The parish was known as the county of the German Coast until 1808, at which time the state of Louisiana named the area St. Charles, which is the ecclesiastical parish name dating from the Spanish period.

As late as 1924 sugar cane was the primary industry of St. Charles Parish. It even boasted nine large sugar mills in 1924. Rice and corn followed closely behind in terms of importance to the parish. Tract farming, such as that of cabbage, was also important, as was the lumbering industry. The parish also had several oil refineries by that time (Louisiana Department of Agriculture and Immigration 1924).

The parish seat of Hahnville, located near the Montz project area, was established by former Governor Hahn. Montz, also located near the Montz project area, on the east bank of the river, is an unincorporated town. After the Civil War, Montz was a small station village located on the Yazoo Mississippi Railroad line. It is located three miles east of Hahnville.

Jefferson Parish was formed in 1825. In the 19th century sugar was the major crop, followed by rice, corn, potatoes and hay (Bragg 1977; Goodspeed Publishing Company 1892). The city Kenner, originally known as Cannes Brulees, Burnt Canes, was named for the Kenner family, which owned much of the land in this parish. The city was incorporated in 1867 (Fortier 1909; Goodspeed Publishing Company 1892). Today the economy of Jefferson Parish has become closely tied to that of New Orleans, and Metairie, Harahan, and Kenner play a major role in local industry, trade, transportation, and manufacturing.

Previous Archeological and Cultural Resources Investigations in the Study Area

No prehistoric or historic sites have been previously reported in the study areas of the six items included in this survey report although several batture surveys have been performed in southern Louisiana. Archeological sites representing virtually all phases of human occupation have been reported from areas adjacent to the survey items. Most of these remains relate to Sedentary period occupations (Muller 1978).

Well defined Tchefuncte occupations have been excavated at Big Oak and Little Oak Islands in Orleans Parish (Shenkel 1974). The Sims site, south of the Mississippi River in St. Charles Parish has yielded evidence for Baytown, Coles Creek, Early Mississippian and terminal Mississippian/Protohistoric components (Davis, personal communication). Upriver from the Sims site in St. John the Baptist Parish, Thomas Ryan and Brian Duhe during 1979 and 1980 excavated the Shellhill Plantation site, an extensive Coles Creek occupation (Davis, personal communication). Major Mississippian components are known from Bayougoula in Iberville Parish and from Fleming in Jefferson Parish (Davis, personal communication).

With the exception of excavation work at several of the sites mentioned above, there has been relatively little systematic archeological investigation in the immediate study vicinity. In 1938, Ascension and Iberville Parishes were included in an archeological survey conducted by Kniffen, but many of the sites that he reported have subsequently been destroyed (Kniffen 1938).

As opposed to many areas of the United States, much early survey work carried out in southern Louisiana (Kniffen 1936, 1938; McIntire 1954, 1958) adopted an environmental deterministic or cultural ecological approach. Because of the unique nature of the Mississippi River Delta, there has always been a close coordination between geomorphology and archeology to the extent that archeological survey data have been used to corroborate geological dating of deltaic complexes (McIntire 1954).

Within a two mile radius of each item surveyed for this project, there are few archeological sites on file at the Division of Archaeology and Historic Preservation at Baton Rouge. All of these sites date to the historic period.

In Ascension Parish, near the Marchand study area, six plantations have been recorded as sites. They are the McCall Plantation, Noel Plantation, New Hope Plantation, Ascension Plantation, and Le Blanc Farm. These sites are all situated on the river bank opposite the study area. The Belle Helene Plantation, located approximately two miles upriver from the Marchand study area is on the left descending bank of the Mississippi River.

In St. James Parish, two previously recorded sites are located within two miles of the study areas. One site, 16SJ5, was recorded by Coastal Environments, Inc., and is described as an 18th and 19th century historic midden. According to the site record, the midden is eroding into the river and has been disturbed by levee work. The St. James Cemetery, 16SJ23, is located near the Convent study area. It was recorded by Southern Archaeological Research, Inc.

Batture and Levee Surveys

Although there has been little reported systematic survey activity in the immediate study area, a number of cultural resource surveys have been conducted along the Mississippi River batture and levees in Orleans, St. Bernard, and Plaquemines Parishes. Several of these studies have produced methodological, theoretical and substantive information relevant to this report.

Dr. J. Richard Shenkel of the University of New Orleans has conducted a number of floodwall, levee enlargement, and revetment surveys for the U.S. Army Corps of Engineers in Orleans, St. Bernard, and Plaquemines Parishes (Shenkel 1976a, 1976b, 1976c, 1977a, 1977b, 1977c, 1977d, 1977e; Shenkel et al. 1976). Cultural resources described in these investigations include a wash of 19th and early 20th century artifacts unearthed in a trench for floodwall construction in New Orleans (Shenkel 1976b), and two structures apparently associated with Fort St. Leon and a cypress plank wall at English Turn in Plaquemines Parish (Shenkel 1976c). Subsequent archeological and historic investigations at English Turn (Shenkel et al. 1977; Shenkel et al. 1978) have focused upon the history of military development in the area. Most of the other surveys conducted by Shenkel (1976a, 1977a, 1977b, 1977c, 1977d, 1977e; Shenkel et al. 1976) did not result in the discovery of cultural remains. In none of these reports, unfortunately, is there sufficient discussion of survey conditions, methodology, or the criteria employed in the acceptance or rejection of cultural remains as archeological sites.

In 1978, three cultural resource surveys were conducted for levee enlargements and revetments in Plaquemines Parish (Rader 1978a, 1978b, 1978c). No cultural resources were reported during these surveys. Again, the absence of explicitly stated site definition criteria makes it difficult to compare the results of these investigations with other work in the area.

In another cultural resource survey for a levee enlargement and concrete slope in Plaquemines Parish, Rader (n.d.) reports the discovery of an historic site consisting of two scatters of ceramics, glass, and brick. These sites are interpreted to be the remains of several outlying structures associated with Upper Magnolia Plantation. The vicinity of Fort St. Leon was also investigated in this brief survey.

A cultural resources survey was conducted by Tulane University along both sides of the Mississippi River levee in south Plaquemines Parish (Davis et al. 1979). Many of the field conditions reported in this study are similar to those encountered by Iroquois Research Institute. A good

description of environment and of survey conditions was provided as well as a fairly complete explanation of field methodology. Although no prehistoric cultural matter was discovered, substantial historic remains were investigated including a fort, cemeteries, settlements, and structural remains. Much of the study area for the Tulane survey was unique in that it had been abandoned in the 1920's (Davis, personal communication). Davis et al. (1979) note and describe the difficulties in defining and delimiting archeological sites from the occasionally widespread artifact and debris scatter that characterize the batture. Twelve site locations are described that consist of artifact scatters. The scatters are composed of brick, glass, ceramics, and metal items, several of which may represent house middens. Subsurface testing often produced no material.

In 1979, Coastal Environments, Inc. conducted a cultural resources survey of the Mississippi River Gulf Outlet in Orleans and St. Bernard Parishes (Wiseman et al. 1979). This survey resulted in the discovery of three prehistoric shell middens, five prehistoric spot finds, a historic foundation and a railroad bed. This report also presents a detailed reconstruction of the paleogeography of the study area. The absence of site definition criteria prevents a determination of what kinds of historic cultural resources may have been noted in the survey, but not reported as sites.

Other recent historic archeological work conducted along the Mississippi River batture in southern Louisiana include test excavations at the site of the Welcome Plantation in St. James Parish (Castille 1979) and recent salvage operations conducted by Coastal Environments, Inc. at several 19th century privies exposed along the batture in the vicinity of the Bonnet Carre Spillway in St. Charles Parish (Castille 1979). These investigations add greatly to an understanding of the kind and range of historic cultural resources that can be expected to occur along the edge of the Mississippi River.

PROJECT METHODOLOGY

Survey Expectations

In the section on previous archeological research a number of problems associated with comparing the results of reported cultural resources surveys performed along the batture of the Mississippi River in southern Louisiana were pointed out. With a few exceptions (Davis et al. 1979) a number of the previous studies consulted for this project fail to adequately describe and discuss the cultural, fluvial, and geomorphological processes that influence the existence of cultural sites in batture areas. The criteria for site definition are often not discussed in these earlier reports thus making it difficult to predict the kinds of cultural materials that would be expected to occur within the batture.

Certain predictions, however, are possible. If prehistoric remains were to be found they would be limited to the late prehistoric period. As explained earlier, in the Geomorphology section of this report, areas along the Mississippi River are subject to various processes including alluvial deposition, lateral bank migration, and subsidence (McIntire 1958). The actual land surface is relatively recent and, as a result, only recent surficial occupations would be expected to occur. The discovery of prehistoric remains in the batture would be thus limited to the late prehistoric period unless erosion had exposed older previously occupied land surfaces along cutbanks. Human excavating activities might also expose deeply buried remains.

Survey reports, such as described in the previous section, offer little insight into the types of historic cultural resources to be expected. Background research performed by Iroquois, and information derived from more informative reports such as by Davis et al. (1979), indicate that the batture was not the focus of intense land use. One would expect to find non-in situ deposits of trash and river deposited debris, whereas in situ remains would consist mainly of structures related to transportation and river access. Where the river is migrating to one side or the other it would be possible to find structures, unrelated to the river, that originally had been situated well inland. In a following section, Iroquois Research Institute has placed an emphasis on site definition criteria and the scientific background associated with the recognition of cultural property along Mississippi River battures.

Field Survey Conditions

The Mississippi River batture in southern Louisiana presents a number of unusual field conditions that affect the conduct of an intensive archeological survey. Recent construction and commercial activity, hydrologic conditions, and dense batture vegetation affect both the actual conduct of the survey and the ease with which archeological sites can be distinguished.

Several of the survey areas, most notably Kenner and Waterford, have been affected to an unknown extent by extensive industrial development, commercial shipping activity, and construction. In addition to these factors, these areas, together with the other four items, have been subjected to varying amounts of recent dumping activity. These factors all contribute to the destruction or covering of in situ cultural resources.

Perhaps the most significant factor affecting the cultural resources and survey conditions in each item is the Mississippi River itself. Depending upon the location of each item, cultural remains are either being destroyed by erosion or buried under point bar deposits. In addition, historic meanders of the river bank have probably removed evidence of human occupation within several survey areas during a number of periods within the last 100 years (Hosman 1972).

The river seasonally floods much of the batture area within each item, and redeposits a wide variety of cultural materials. In several survey areas, particularly where there is a nearby population center, the river bank is littered with an almost continuous scatter of river displaced trash: metal cans, bottles and bottle glass, shell gravel, plastic, lumber, and other items. Some of this material is clearly of 19th century derivation, but in this context it is inseparable from recent trash.

Batture flooding was not generally a problem for this project since the fieldwork occurred in mid-September, well before the high water stage of the Mississippi River. Nevertheless, areas of standing water existed within old borrow pits in some study areas, particularly near the levee within the Convent Borrow item and in the downstream fifth of the Kenner Revetment.

The seasonal fluctuation of the river level has an important effect upon local vegetation conditions. Flora encountered within the batture ranged from communities of sandbar willows and herbaceous vegetation near the river bank to more mature elm-cottonwood-live oak forests further inland. In most areas, communities composed of sandbar willow thickets near the shore and small to mature willows and cotton woods inland create poor conditions for an archeological survey. Ground visibility is for the most part very poor and physical movement through the vegetation is difficult.

Although describing conditions farther upstream along the Mississippi River, Shelford (1963:96) accurately depicts undergrowth conditions within the mature batture forest in the study area:

The trumpet-vine comes in with the cottonwood and willow on the ridges and persists at least up to the sugarberry stage. Poison ivy is frequently more abundant in the willows of the flats than elsewhere. It appears in the succession before the grape. Grape becomes abundant on the ridges. In some areas, pepper-vine takes the place of trumpet-vine. The trumpet-vine, poison ivy, grape, pepper-vine, honeyvine, sometimes buckwheat vine, and morning-glory make a tangled mass so dense and binding as to make passage very difficult except along trails.

Within the batture forest these conditions are exacerbated by the presence of fallen trees and large amounts of vine-covered driftwood and other river deposited debris. Conditions improve outside of the batture forest, however, particularly along sandy river banks where willow thickets and herbaceous plants are sparse or absent.

In two study areas, Montz Revetment and Convent Levee Enlargement Borrow, vegetation conditions, unlike the other survey items, were typical of a more advanced stage of ecological succession. Both areas are located on point bars where long term deposition has raised their elevation to the point where a more flood intolerant vegetation can survive. At Montz, the presence of a relatively high canopy associated with a competitive mature forest has reduced lower story undergrowth and significantly improved ground visibility conditions. At the Convent borrow area, a significant portion of the study area was comprised of a cattle pasture within an open forest of scattered elms, live oaks, and willows. Visibility in this area was quite good.

Survey Methodology

The field crew available for the archeological survey varied between four and nine individuals. The survey of each individual item was carried out by crews numbering from two to six archeologists. The Marchand, Willow Bend, and Waterford rights-of-way were surveyed by transects aligned parallel with the existing levee and riverbank. These items were relatively short and could be easily surveyed by walking the length of each area. At the other three items, transects were aligned perpendicular with the levee. Table 2 summarizes the survey techniques employed at each item.

Transects running parallel with the river and levee were usually spaced at 30 meter intervals, but sometimes closer, depending upon the width of the right-of-way and the number of people surveying. Transects were spaced at 20 meter intervals at Waterford; at Willow Bend and Marchand they were spaced at 30 meters. The average transect interval exceeded 30 meters at some areas because of water filled borrow pits and flooded areas that could not be surveyed as well as inaccuracies in pacing.

At items surveyed along transects oriented perpendicular to the river and levee, the spacing interval was set at 30 meters. For similar reasons to those described above the average transect interval in these items ranged between 26 and 32 meters.

TABLE 2

SUMMARY OF ARCHEOLOGICAL SURVEY

<u>Item</u>	<u>Orientation of Transects to River & Levee</u>	<u>Length of Item (Meters)</u>	<u>Average Width of Item (Meters)</u>	<u>Number of Transects Surveyed</u>	<u>Average Transect Interval</u>
Marchand Revetment					
Upstream area	parallel	457	102	3	34.0
Downstream area	parallel	610	267	6	44.5
Convent Levee					
Enlargement	perpendicular	4023	73	142	28.3
Borrow Area	perpendicular	533	482	20	26.7
Willow Bend					
Revetment	parallel	1520	122	4	30.5
Montz Revetment	perpendicular	366	183	12	30.5
Waterford Revetment	parallel	1219	64	5	12.8
Kenner Revetment	perpendicular	5480	139	171	32.0

Each survey area was usually identified in the field by comparing existing levee station markers with station information presented on project maps supplied by the Corps of Engineers. In most areas it was also possible to locate each item with respect to houses, roads, and other features shown on project maps and visible in the field.

Site Definition

The recognition and definition of historic archeological sites is a major methodological problem associated with any investigation along the Mississippi River batture. As mentioned previously, several survey items were characterized by an almost continuous scatter of secondary historic and modern artifact deposition along the bank of the river. Extensive trash dumping also occurs along the landward edge of the batture forest near the riverside toe of the levee. Conversation with the Chief Engineer of the Jefferson Parish Levee Board confirms that the area between the batture forest and the levee is often used for dumping by local residents and contractors. To keep the levee toe clean, garbage is regularly bulldozed into the forest where it accumulates (Middleton, personal communication).

The separation of discrete clusters of cultural materials recognizable as historic sites from these widely distributed artifact scatters and dumps is a major problem. An obvious solution might be to inventory all historic cultural materials that are observed within each survey area. This approach would present almost insurmountable methodological problems along many areas of the batture, however, where fluvial action has deposited an almost continuous scattering of historic and modern trash. The time required to adequately perform such an inventory would be exponential.

Another solution might be to designate all discrete scatters of high density material such as brick, concrete, metal, and other items as sites; ignoring the presence of light density continuous deposits of items such as bottle glass, plastic, wood, metal containers, and other small artifacts. Davis et al. (1979), in a recent report of an archeological survey along the Mississippi River below New Orleans, have conceded that such an approach introduces an arbitrary element of judgement into site identification.

For the purposes of this study, historic sites are defined as extant, in situ structural remains or places where a domestic occupation or intensive economic activity took place. These criteria usually exclude roads, fences, isolated historic trash dumps, isolated artifacts, abandoned vehicles, and litter. For prehistoric remains the singular presence of a midden or artifact scatter would be sufficient criteria for site definition. However, prehistoric remains were not discovered at any of the items surveyed in this project.

Although these criteria for the designation of historic sites appear relatively clear, the widespread occurrence of low density artifact scatters and dumps within the survey areas often complicated site recognition. Before the ubiquitous nature of such scatters and dumps were isolated in the field, one was initially recorded as a historic archeological site.

The scattering of artifacts and other cultural debris in the survey areas results from river deposition of flotsam and jetsam, especially after flooding; erosion of formerly buried or surficial dump sites; primary trash dumping; and erosion of artifacts associated with occupation areas. Such scatters were generally not recorded as sites unless there was some evidence that they might have been associated with a definable occupation or economic activity area.

Upon discovery of a tentative archeological site, survey procedures were suspended and site verification was undertaken. A site datum was established, usually near the center of each site. If in situ structural remains or other surficial features were present, these were cleared of vegetation and mapped on a site plan. Depending upon specific conditions prevailing at each site, systematic or selective samples of surficially occurring artifacts were performed. Systematic samples were collected at every archeological site. Around structures where surface artifacts were very scarce and not clearly associated with the site, only a selective sample was made. If only a small quantity of artifacts were observed, a

100 percent collection was performed. For example, the wooden retaining wall, to be described later in the results section, was the only site in this project in which all observed artifacts were collected. At archeological sites, shovel tests measuring 30x30x30 centimeters were excavated to assess the subsurface contents. If the site occurred in the vicinity of a cutbank area, the walls of the bank were inspected for more deeply buried cultural material. All site information was recorded on pretested forms and in field notebooks. The site area was photographed. Specific details of site examination procedures at each site have been incorporated in the site descriptions.

All cultural materials recovered from the surface and subsurface tests at each site were bagged by provenience. Provenience data were kept separate for all shovel test units, systematic surface collection units, and selective grab samples.

Laboratory Methodology and Artifact Classification

The cultural materials recovered from the surface and shovel test procedures conducted during fieldwork operations of this study have been divided into gross categories based upon morphological characteristics. Since only historic sites were discovered during the survey, the artifacts are all historic remains. The categories of historic artifacts are glass, ceramics, metal, construction material, and miscellaneous material.

The historic materials are dominated by glass remains which were classified by color, shape, and when possible, by function and mode of manufacture. References consulted in the analysis of glass shards include Oliver (1977), White (1978) and Yakubik (1979).

The majority of the ceramics collected were whiteware as defined by Yakubik's (1979) criteria of a refined opaque white body and clear colorless glaze. Price (1979) does not satisfactorily differentiate whiteware and ironstone. For this analysis, ironstone is considered to be a variety of whiteware due to the lack of consistent morphological characteristics. Two partial potter's marks were evident on whiteware sherds and Kovel and Kovel (1953) was consulted although it proved unuseful here. Small amounts of earthenware and stoneware were recovered during these projects. Earthenware was defined by an offwhite colored and crudely textured paste with a lead or yellow glaze, while stoneware was characterized by a gray colored paste with a salt glaze.

Metal and construction remains collected during this project were classified on the basis of morphology and function. Most appear to be modern. Nails were described and dated according to Nelson's (1968) nail chronology.

SURVEY RESULTS

Overview

The archeological survey of the areas associated with the six items in Work Packets Two and Three resulted in the discovery of five historic sites. No prehistoric archeological evidence was observed in any of the study areas. Four sites in the Kenner Revetment and one in the Convent Levee Enlargement were discovered. No historic sites were recognized at Willow Bend, Waterford, Montz, or Marchand. In addition to the defined sites, extensive and widespread scatters of historic and modern material occurred in each area, but were particularly apparent at Kenner Revetment and Convent Levee Enlargement. Much of this material has apparently been deposited or scattered by the river. Other isolated artifact and debris scatters are apparently the result of trash dumping activities within the batture.

River deposited material was usually characterized by a generally uniform and omnipresent distribution of flotsam and jetsam such as driftwood, lumber, metal buoys, rope, plastic objects, ship and barge fittings, cans, bottles and bottle glass, and other items. Such material was found throughout the batture but was particularly common along the riverbank.

Other scatters of cultural material appeared to represent the results of erosion and redeposition of material formerly in situ at some point along the river bank. These scatters typically consisted of linear deposits of glass fragments, ceramics, metal objects, concrete fragments, shell gravel, fragmented bricks and other building materials along the river shore. The source of these deposits was often impossible to pinpoint. It is suspected that most of these scatters represent the remains of eroded and redeposited trash dumps. No in situ structural remains were noted in the vicinity of any of these and they often contained a wide variety of materials.

At Kenner Revetment, in particular, the entire batture as well as the riverbank itself has been utilized for many years as a dumping area by local inhabitants and building contractors (Middleton, personal communication). Largely uneroded trash dumps were observed throughout the batture but were especially prevalent near the levee toe. These dumps contained an extremely diverse assemblage of artifacts, including all types of construction materials, metal objects, plumbing, household appliances, vehicle parts, playground equipment, kitchen wastes, ceramics, glass, plastic items, and dead pets.

The five sites recognized during the survey represent a wide variety of cultural resources. It should be noted that two of the sites included in this discussion may represent trash dumps or artifact scatters that do not conform to the minimal requirements set forth in the preceding chapter for definition as historic archeological sites. They were initially recorded as sites in the field, however, and exemplify the problems of site definition along the Mississippi River batture.

Site Descriptions

All five sites discovered during the survey of Kenner Revetment and the Convent Levee Enlargement are described in the following section. Final Louisiana state trinomial designations have been assigned to three of these sites; the remaining two sites are referred to by preliminary site numbers assigned during the survey by Iroquois Research Institute.

In addition to the five numbered sites discussed below, several glass and ceramic artifacts illustrated on Plate 4 were recovered from a 100 meter stretch along the river bank at the Convent Levee Enlargement. These items were simply scattered at the river's edge and appeared to have been washed up by the river. Although this area was not defined as a site, the scatter included several potentially diagnostic artifacts including two complete bottles, one of which is artifact No. 1 in Plate 4. An opaque turquoise glass base, probably dating between 1815 and 1885 was also recovered from this area. This is artifact No. 2 as illustrated in Plate 4. The total sample of historic material recovered along the bank in this area is itemized on Table 3.

PLATE 4

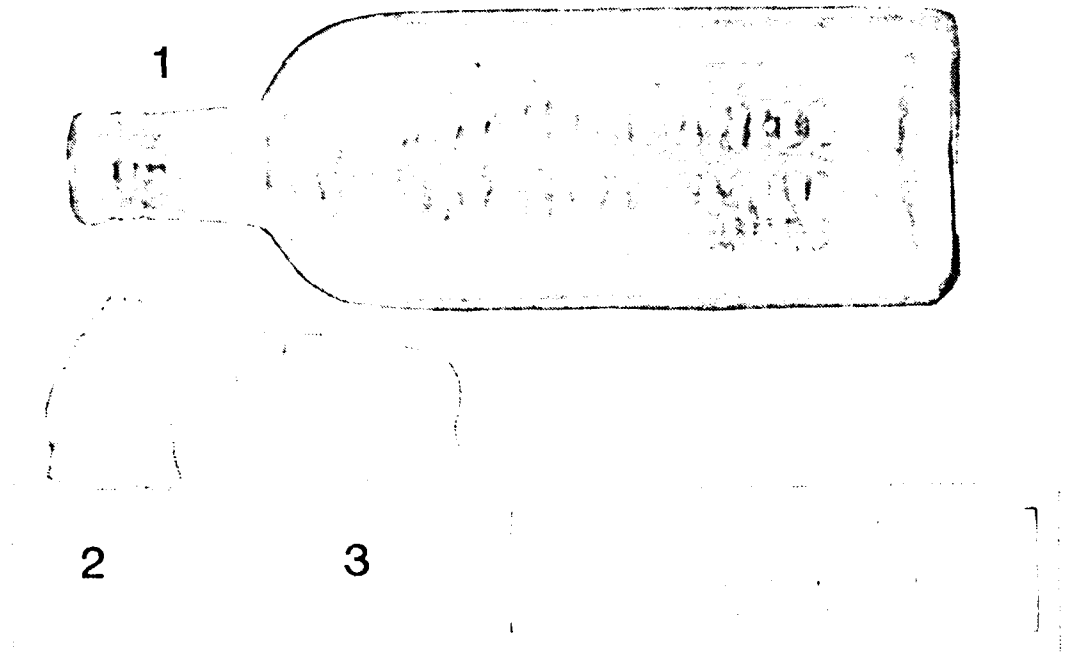


Plate 4. Historic Artifacts from Riverbank and WP3-1. (1) Clear green tinted bottle which reads "DR. W.B. CALDWELL'S LAXATIVE SENNA" recovered from the Mississippi Riverbank in Convent Revetment. (2) Turquoise Opaque Glass Base Fragment recovered from the Mississippi Riverbank in Convent Revetment. (3) Porcelain body sherd from WP3-1. No. 1547-9

TABLE 3

HISTORIC CULTURAL REMAINS FROM A SELECTIVE SURFACE COLLECTION ALONG THE MISSISSIPPI RIVER- BANK IN CONVENT REVETMENT

	<u>Provenience Surface</u> <u>Selective</u>
<u>Glass</u>	
Blue Bottle Base Fragment	1
Clear Green Tinted Embossed Bottle	1
Opaque Turquoise Bottle Base	1
Clear Pale Green Bottle Base	1
Clear Bottle Screw Top	1
Brown Curved Bottle Fragments	1
Clear Liquor Bottle 1/2 pint	1
<u>Ceramic</u>	
Whiteware Transfer Print	5
Whiteware Sherds	2
Whiteware Painted Sherd	1
Earthenware Lead Glaze	2
	<hr/>
TOTAL	17

Site 16SJ31

Site 16SJ31 was the only historic archeological site encountered in the survey of the Convent Levee Enlargement. The site was discovered during the transect survey of the downstream section of the levee enlargement area. It was first observed as a line of vertically placed planks intersecting a transect. After the survey crew cleared the area the site was found to be a low wall consisting of buried or broken wooden planks. The wall parallels the existing levee for approximately 110 meters. The site is situated approximately 35 meters inland from the riverbank and is 60 meters from the existing levee. The wall is located immediately riverward of a steep erosional cutbank which separates the batture forest from a grassy area along the riverside toe of the levee. The individual planks comprising the wall are approximately two to three centimeters thick and are as much as 30 centimeters wide. They rarely extend more than 30 centimeters above the surface of the ground and are angled slightly toward the levee. At regular intervals, the wall is buttressed by low vertical beams and reinforced by short diagonal braces. Wire nails were utilized in the construction of the wall.

A datum was established near the center of the wall and a selective collection of surficially occurring artifacts was performed within a radius of five meters from the datum. Because the observed artifact sample was so small, all observed artifacts were collected. In addition, two 30x30x30 centimeter trowel tests were performed on both sides of the wall to determine if the presence of the wall had affected soil conditions on either side. In both tests, the soil consisted of a silty alluvium overlying denser clays. No cultural materials were recovered from either trowel test.

Only four historic artifacts were observed and recovered at 16SJ31. A clear glass shard embossed with "4/5" was collected as well as a brown shard from a liquor bottle embossed with "Hiram Walker." A dark olive green bottle base with no evident seams was found at this location. The manufacture of this item may predate 1810 since bottles blown in molds became common after that time. A base sherd of whiteware was also recovered that exhibits a potter's mark, but the marking is illegible. These pieces of surficial cultural debris may not be related to the structure at 16SJ31 since they were recovered from an area that is frequently flooded and disturbed by river action.

The construction, alignment, and location of the wall at 16SJ31 strongly suggest that the feature represents the remains of a wooden retaining wall designed to control erosion during high water stages of the Mississippi River. Historic data do not exist to allow a determination of the age of the structure, but the presence of wire nails in the wooden planks indicate that it probably dates to the 20th century.

Site WP3-1

This site was discovered at the upper end of the Kenner Revetment. It was initially observed as a compact scatter of concrete fragments, loose brick, asphalt, and other cultural debris including a rusted washing machine and a partially buried 55 gallon drum. The cultural material was visible along the landward edge of the batture forest, just outside of the cleared area associated with the riverside toe of the existing levee. It is situated approximately 45 meters from the levee. The scatter measures approximately 33 by 23 meters and was initially thought to have been possibly related to a former structure in the area.

A datum was established near the center of the scatter and base lines were laid out following the cardinal directions. Fourteen shovel tests measuring 30 x 30 x 30 centimeters were excavated at five meter intervals along each axis, and a 2 x 2 meter area surrounding nine of the shovel tests was subjected to a systematic surface collection. A systematic collection was done at this site because of the large quantity of cultural material scattered across the site. With the exception of heavy construction debris, all artifacts within each 2 x 2 meter surface collection unit were recovered. The shovel tests proved to be sterile, with the exception of a bicycle frame observed in shovel test ON10W which was not removed.

A total of 22 artifacts were recovered from the surface collection at WP3-1. Five pieces of glass, four fragments of ceramics, five metal items, six pieces of construction material, one fragment of a fuse, and a fragment of shell were collected. The proveniences of these items is presented in Table 4.

TABLE 4

HISTORIC CULTURAL REMAINS FROM WP3-1

	<u>Systematic Surface</u>			
	ONO	ON5W	5NOE	TOTAL
<u>Glass</u>				
Clear Green				
Bottle Fragment	1	-	-	1
Clear Curved Shards	-	3	1	4
<u>Ceramics</u>				
Porcelain Transfer				
Print Sherd	-	1	-	1
Glazed Tile	1	1	1	3
<u>Metal</u>				
Bolt and Nut	1	-	-	1
Washer	1	-	-	1
Pipe Elbow	-	1	-	1
Scrap	1	-	-	1
Valve and Spring	-	-	1	1
<u>Construction</u>				
Brick	1	-	-	1
Asbestos Shingle	3	2	-	5
<u>Miscellaneous</u>				
Rubber Coated				
Fuse Fragment	1	-	-	1
Shell Fragment	-	1	-	1
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTAL	10	9	3	22

The glass artifacts include four pieces of clear curved bottle glass with lateral seams evident. One of these shards is a base of a bottle. The remaining glass artifact is a fragment of a clear green bottle with seam that is embossed with the words "FLAVOR GUARD BOTTLE REFILLING PROHIBITED." These glass remains are all of recent derivation (Yakubik 1979).

Ceramic artifacts consist of one sherd of porcelain pictured as No. 3 in Plate 4, that exhibits a transfer print floral design, and three pieces of glazed tile. A piece of the tile still has mortar on it.

Five metal items were collected and all are rusted and corroded. The items are utilitarian objects such as a bolt and nut, a washer, a lead pipe elbow for plumbing use, a valve device and spring, and a piece of scrap metal.

Construction debris recovered from this site includes one piece of red brick and five pieces of asbestos shingles. The shingles were likely made to be used on the exterior of a building. A fragment of a rubber coated fuse was also collected. A single piece of unmodified Rangia shell was also collected.

The ceramic, metal, and construction materials recovered at WP3-1 are modern materials and suggest a recent utilization of this location.

No in situ foundations or other structural remains were located in the area of WP3-1, but similar scatters of modern construction debris and artifacts are quite common along the landward edge of the batture forest throughout the Kenner Revetment. Conversation with William Middleton, Chief Engineer of the Jefferson Parish Levee Board (Middleton, personal communication) revealed that this area of the batture is often used by private individuals and building contractors for dumping activities, and the site exemplifies a commonly occurring type of artifact scatter in the study area. Such scatters do not conform to our operational site definition criteria and were generally not recorded as historic archeological sites.

Site 16JE136

Site 16JE136 was initially observed as a dense scatter of bricks, sandy mortar, ceramics, glass, and nails along the Mississippi River bank in the upper third of the Kenner Revetment. As shown on Plate 5, most of the cultural material was observed in a surface scatter extending approximately 43 meters along the river's edge. There is a recent river cutbank immediately inland of the scatter, and most of the scattered artifacts and construction debris have probably eroded from the bank. The face of the cutbank was cleaned and some uncoursed bricks were still exposed at a depth of 50 centimeters in a two-meter section of the profile, along with some charcoal and burned clay. Many of the bricks in the cutbank, as well as those scattered at the river's edge, appear to have been exposed to a fire or great heat. No evidence of in situ structural foundations was recognized at the site, either in the cutbank or on the surface above the bank.



Plate 5. Northward view of Site 16JE136. This photograph shows a dense scatter of bricks that have eroded from the cutbank at the right. Fluvial action has spread the bricks over a 43 meter expanse of the Mississippi River bank. Only a few uncoursed bricks were still evident in the cutbank.

No. 1549-8

A datum was established in the center of the brick scatter and 11 shovel tests were performed at five meter intervals along a North-South baseline. Systematic surface collections were performed within 2 x 2 meter areas surrounding two shovel tests near the center of the site, where the cultural material appeared to be eroding from the bank, and a selective collection of potentially diagnostic historic artifacts was taken from the entire site area. All of the shovel tests proved to be sterile.

The cultural remains recovered from 16JE136 include 106 artifacts. Glass, ceramic, metal, and miscellaneous artifacts were collected from the surface of this site. Specific provenience information is contained in Table 5. A total of 41 glass items was recovered. Only four pieces of clear window glass are included in the assemblage; the remainder consists of curved glass. Twenty-six olive shards were collected. These fragments appear to represent two bottles. These items appear to be handblown, no

TABLE 5

HISTORIC CULTURAL REMAINS FROM 16JE136

	<u>Provenience Surface</u>			
	Selective Grab	SSO Systematic	SNO Systematic	TOTAL
<u>Glass</u>				
Window Fragments	2	2	-	4
Clear Curved Shards	3	1	2	6
Opaque Olive				
Curved Shards	2	23	1	26
Hand Blown Clear				
Curved Shards	1	-	-	1
Clear Brown				
Curved Shards	1	-	1	2
Clear Aqua Curved				
Shards	1	-	-	1
Pale Green Curved				
Shards	-	-	1	1
<u>Ceramic</u>				
Whiteware Sherds	13	9	-	22
Whiteware Transfer				
Print Sherds	-	1	-	1
Earthenware Yellow				
Glaze Sherds	4	1	-	5
Stoneware Salt				
Glaze Sherds	2	2	-	4
<u>Metal</u>				
Machine Cut Nail	1	2	9	12
Bolt	-	1	-	1
Door Hinge	1	-	-	1
Horseshoe	1	-	-	1
Oar Lock	-	-	1	1
Caster	-	-	1	1
Bar	-	-	1	1
Scrap	-	-	1	1
<u>Miscellaneous</u>				
Slag	1	-	-	1
Coal	-	7	-	7
Bone	2	2	-	4
Rock	-	-	1	1
Mortar	1	-	-	1
TOTAL	36	51	19	106

seams are evident, and the laid on rings as collars are uneven and crude. The olive glass is weathered and patinated. The condition of the shards and the characteristics of manufacture suggest that these specimens are not of recent manufacture. Seams are evident in bottles produced past 1810 and opaque glass was very common prior to 1880 (Yakubik 1979). Laid on ring collars became smoother and more polished about 1880 with the development of the glory hole furnace (Oliver 1977). One shard exhibits a rounded kickup base. The combined characteristics of these shards suggest a possible date of production in the mid-nineteenth century.

Seven clear curved bottle fragments were recovered. One piece is a seamless neck piece exhibiting a closure bead. Striations are evident along the neck, suggesting that the piece was handblown, applied and smoothed. Clear glass bottles were not produced until 1880 (Yakubik 1979); therefore, it is likely that this item postdates 1880. Two pieces of clear curved glass are embossed and probably are recent. One of the remaining clear shards is heavily patinated probably from exposure to the elements. Two clear shards are engraved with a stylized monogram and have been burned. With the exception of the bottle neck, the clear curved shards appear to be of recent manufacture.

Four pieces of clear colored curved glass were also collected from the surface. One dark brown shard exhibits many bubbles and may be handblown. The remainder are brown, aqua and pale green.

Thirty-two ceramic pieces were recovered from the site. The dominant ceramic type is whiteware exhibiting a white paste and clear glaze. Twenty-three whiteware sherds were collected including four base sherds, eleven rim sherds, and eight body sherds. One rim sherd is designed with a floral transfer print. Five pieces of thick crude earthenware with a yellow glaze were collected and consist of one base and four body sherds. Four pieces of stoneware, three body and one base sherd, were found at this site and exhibit a salt glaze.

Nineteen corroded metal objects consisting of 12 machine cut nails, a large bolt, a hinge, a copper coaster, a metal bar fragment, an aluminum fragment, a muleshoe, and an oarlock were collected. All the artifacts appear to be of recent manufacture. The machine cut nails, for example, may have been made any time between the late 1830s and the present (Nelson 1968). The muleshoe is distinguishable from a horseshoe by its narrow, thick shape; it also exhibits a metal strip attached to the toe arch. The muleshoe and a machine-cut nail are illustrated in Plate 6.

Generally, the artifact assemblage from 16JE136 is recent in nature. The olive bottle fragments may date to the mid-nineteenth century, but the time of deposit at this location is not known.

The brick scatter and other construction materials at 16JE136 may represent the remains of a former structure in the site area. No structures are indicated in the batture at Kenner Revetment on Chart 75 of the Mississippi River Commission (1895), however, and no surviving structural foundation was observed on the surface of the site or in the cutbank. It is probable that if a structure had existed at 16JE136 lateral migration of the Mississippi River may have destroyed it, resulting in the surficial scatter of bricks, mortar, and other materials along the river bank.

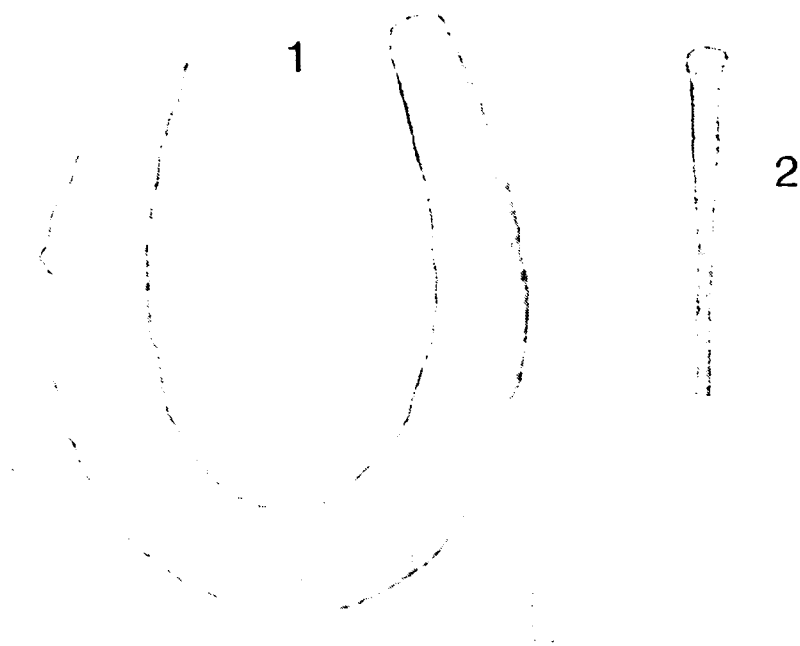


Plate 6. Historical metal artifacts from 16JE156. (1) Probable bullethead. (2) Machine-gun nail.
No. 1647-16.

It is also possible that the materials observed on the bank and exposed in the cutbank are the result of an isolated dump. The Kenner area has been inhabited by a relatively large population for much of the 20th century, and local inhabitants and contractors have dumped debris throughout the batture for some time (Middleton, personal communication). Construction materials such as those observed at 16JE136 are a common component of such dumps. Regardless of whether the site is the remains of a former structure or dump site, its original context has been almost completely destroyed by erosion of the river bank.

Site WP3-3

This site consists of a square concrete slab foundation situated within the Kenner Revetment batture approximately 150 meters from the levee and 40 meters from the Mississippi River. The foundation measures approximately 12 x 12 meters and rises roughly 20 centimeters above the surrounding area. The foundation is surrounded by shell gravel extending between one and three meters from the edge of the structure. A broken concrete support or pillar measuring two meters in length lies near the center of the foundation. Imbedded in the northeast corner of the slab is a metal pipe opening approximately 15 centimeters in diameter.

The slab was covered with a light scatter of historic artifacts and debris, but few artifacts were observed in the surrounding gravel. A datum was established near one end of the fallen pillar and a selective collection of artifacts was performed in the area of best visibility in the southeast corner of the slab, an area measuring approximately 6 x 6 meters. No subsurface testing was performed at the site.

The historic artifact assemblage recovered from site WP3-3 consists of eighteen items. The surficial remains include glass, ceramic, metal, and miscellaneous material, all which are recent in origin.

The majority of artifacts are glass. Eight clear shards, three clear brown shards, and one clear green shard were recovered from this site and appear to be fragments of recent bottles or jars.

The only ceramic artifact from this site collection is a whiteware sherd with a blue transfer print. A scrap piece of tin was recovered but is distorted in shape, probably as a result of pounding and melting. Its final form could not be determined. Four fragments of asbestos construction tile were also found at this location.

It is suspected that the surficial scattering of artifacts observed and collected at WP3-3 are probably not directly related to the structures or activities present on it. All of the artifacts are relatively light and small items which may have been deposited in the site area by fluvial action. The construction of the slab and the artifacts recovered from the site indicate that WP3-3 dates well into the 20th century. Concrete slabs are often built and abandoned in the batture area, and are usually associated with storage facilities or dock loading activities (Middleton, personal communication). The site is adjacent to a dirt road leading to the levee.

Site 16JE137

Site 16JE137 consists of the fragmentary wooden hull of a ship or boat, beached along the edge of the Mississippi River. The hull is located within a repair facility operated by Zito-Metcalf Marine Repairs of St. Rose, Louisiana. The field crew was directed to the site by personnel employed by the repair firm.

The ship's hull was found to be resting on the bank with the aft end projecting slightly into the river. The stern of the vessel is completely missing, as is the bow. The existing length of the hull is almost 30 meters; its width is approximately 20 meters. The wooden hull is of double construction with a wooden keel, massive ribs and planking secured with square nails, bolts, and wooden pegs or plugs. Decks and other internal features have disappeared from the vessel. Plate 7 illustrates the interior of the hull.

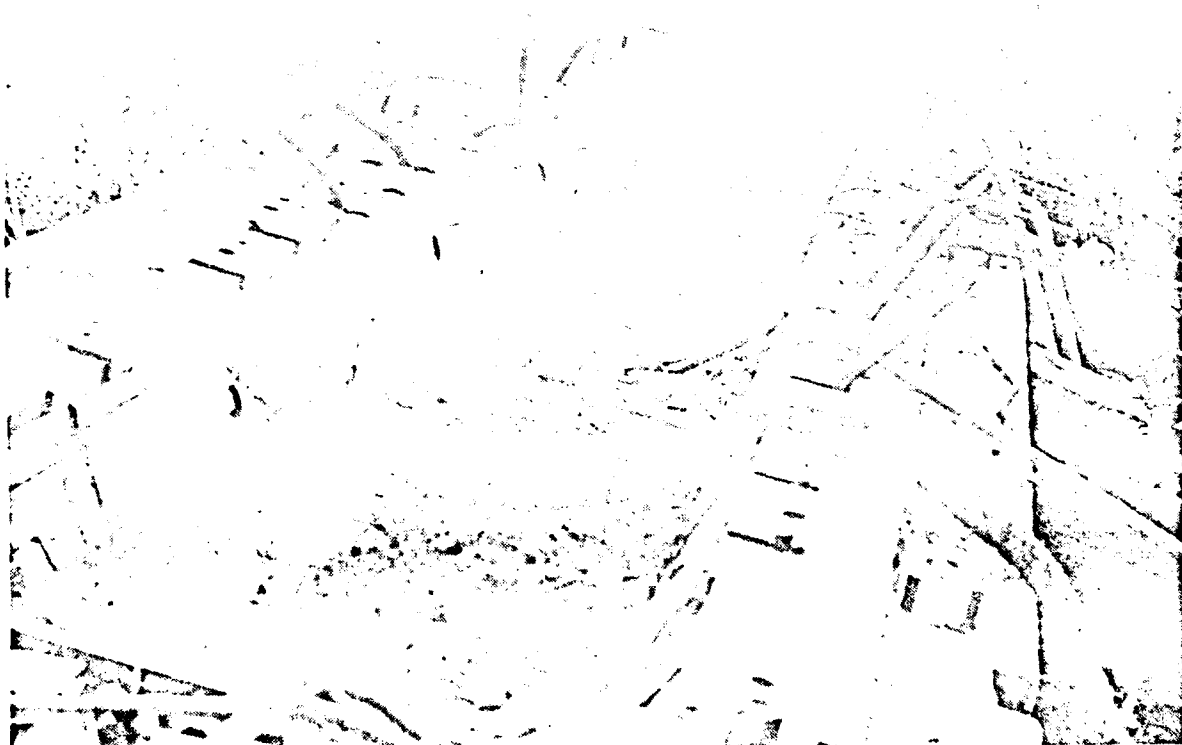


Plate 7. Northward view of Site 16JE137. This photograph shows construction details in the interior of the wooden hull discovered at the site. Of note are the two metal plates along the fore-edge of the longitudinal beams and the protruding metal bolts.

No. 1549-3

Indications of an engine, propellor shafts and screws are absent, but several metal plates found within the hull may represent engine supports. At the time of investigation, grass was growing on silt deposited within the hold, suggesting that the vessel had lain on the bank for several years. The exterior of the vessel is still covered with a weathered coat of red paint. No artifact collections were made from within or surrounding the ship since there were no artifacts in good association with the vessel.

Direct evidence for the hull's age is not available, but informant information indicates that it is probably not of great age. The Owners of the Zito-Metcalf repair facility (Metcalf, personal communication) indicate that the hull may represent the remains of a ship from the Mobile or Pensacola area that sank near the repair facility about five years ago. While being salvaged, the hull reportedly broke apart and the remnants were beached at the location of 16JE137. The salvage operation was reportedly carried out by the Bisso Marine Co. of New Orleans (Metcalf, personal communication). In order to corroborate this account, three marine and salvage firms operating under the name of Bisso were contacted. None of these companies, Bisso Marine, Bisso Towboat, or Bisso E. N. and Son, Inc., was able to confirm that their firms performed the reported salvaging operation.

In spite of the fact that informant information concerning the hull is inconclusive, there is evidence to indicate that the vessel may not be particularly old. In addition to the surviving coat of paint, the wooden structure itself is remarkably well preserved. If the hull had lain for a protracted period beneath the water, the wood would have decayed rapidly upon exposure to the atmosphere. There is nothing about the construction of the vessel that argues definitely for an early construction date; wooden plugs or pegs are still occasionally used in the construction of wooden vessels (Metcalf, personal communication), and the bolts, nails, and metal plates within the hull are probably quite recent (Metcalf, personal communication).

SUMMARY AND RECOMMENDATIONS

The geomorphology, prehistory, and history of the study area indicated that the cultural resources observed and inventoried during this survey were typical of what would be expected within the Mississippi River batture. As predicted in the survey expectation section, land use in the batture was and is of low intensity. Evidence of past and recent dumping activities was prevalent. In situ remains discovered during the survey were related to erosion and flood control and riverside industrial activities. The boat fragment, 16JE137, for example, is typical of the kind of river related site discovered in the batture. In addition, it is evident that where erosion is not a mitigating factor, and where sufficient area is available, such as at the Convent item, batture zones can be used directly for grazing animals. Prehistoric sites, as expected, were not discovered.

The five sites discovered during the archeological survey of the Kenner Revetment and Convent Levee Enlargement represent a wide range of historic and modern activities. 16SJ31 in the Convent Levee Enlargement, is a structure presumably erected to help control erosion caused by lateral migration of the river. WP3-1 is typical of many historic and modern trash dumps scattered along the batture in the Kenner Revetment, and 16JE136 may be the eroding remains of a similar, but earlier, dump along the river's edge. WP3-3 is a modern cement foundation probably related to industrial or shipping activity along the riverfront at Kenner Revetment. 16JE137 is the fragmentary remains of a salvaged boat or ship.

In addition to the five identified sites, a wide variety of historic and modern artifacts was found scattered throughout many surveyed areas. Most of these artifact scatters consist of recent trash dumps or flotsam and jetsam scattered along the exposed bank of the river. Unless there was demonstrable evidence that the scattered artifacts represented a formerly in situ deposit, such as 16JE136, they were not recorded as sites.

As expected, no prehistoric sites or artifacts were discovered within the batture. Prehistoric occupations as old as 4700 B.P. may occur at depths of 20 to 30 feet in the study area, but the likelihood of recovering cultural remains predating 1000 B.P. near the surface in any of the items is quite remote. Even late prehistoric remains should usually be buried beneath a layer of recent alluvium. Erosional banks and human excavations in each survey area were inspected for evidence of prehistoric sites, but none was located.

The study area rests within an area of the Mississippi River that has been occupied during the historic period since approximately 1720. Intensive settlement, however, did not begin until the first decade of the

19th century and was a result of the rise of the sugar industry. Artifacts recovered from the survey areas are predominately of recent origin, but several bottle glass fragments may date to the mid-19th century. Depending upon local meanders of the river channel, it is possible that historic material dating into the mid-18th century may be preserved in several of the survey areas. Much of this material, however, is probably buried under recent alluvium or scattered by erosion.

Recommendations

The cultural resources survey of the six levee or revetment construction items in Work Packets 2 and 3 resulted in the discovery of five historic sites. As was expected based upon the geomorphological history of the study area, no prehistoric sites or artifacts were recognized at any of the items. Four historic sites, WP3-1, 16JE136, WP3-3 and 16JE137, were located and investigated within the Kenner Revetment survey area. A single historic site, 16SJ31, was discovered within the Convent Levee Enlargement project area. All five sites fall completely within the project rights-of-way and are subject to destruction or heavy disturbance by construction and related support activities.

Significance of the Resources

The National Park Service, Department of the Interior, established the following criteria of significance:

National Register Criteria for Evaluation. The quality of significance in American history, architecture, archeology and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant in our past; or

(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded, or may be likely to yield, information important in prehistory or history (Code of Federal Regulations, Title 36, Chapter I, Part 60.6).

The literature search, archival review, cartographic review, background research, and field investigations have yielded no evidence that any of the inventoried sites can be associated with significant events or important persons in local, regional, or national history. None

of the sites inventoried, therefore, is considered to be eligible under criteria "a" and "b."

Three of the sites discovered, WP3-3, 16JE137 and 16SJ31 consist of structural remains that may be evaluated with respect to criterion "c." WP3-3 is a concrete slab foundation, probably for a storage tank or other industrial structure. The site is clearly quite recent and it does not represent a unique structure. 16SJ31 is the remains of a wooden retaining wall. This site also probably dates to the 20th century and is typical of many attempts to control the fluvial action of the Mississippi River. 16JE137 consists of the remains of a wooden hulled vessel. Informant information indicates that the vessel incorporates no unique or significant construction details and is typical of a number of wooden hulled vessels produced in the 20th century (Metcalf, personal communication). The extremely fragmented nature of the vessel also reduces the potential value of the hull with regard to criterion "c." None of these three sites are deemed to embody sufficient unique design merit or craftsmanship to merit inclusion in the National Register under criterion "c."

Given the generality of criterion "d", most archeologists stress that the quality of significance in many historic and prehistoric sites rests in the potential ability of the data present at a site to address explicitly defined research questions of local and national importance (see e.g., Goodyear et al. 1978; Raab and Klinger 1977; Iroquois Research Institute 1977; but compare Sharrock and Grayson 1979).

Scientific historical archeology is still poorly developed in much of Louisiana (Koch, personal communication). Nevertheless, many established or important research priorities exist concerning the plantation period and subsequent developments. There is, for example, a general lack of archeological data from Louisiana comparable to other areas of the southeast (Lewis and Hardesty 1979) concerning the internal spatial arrangement of plantations and the relative roles of owners, overseers, and slaves (Rodrigues, personal communication).

A major emphasis in southern Louisiana is placed upon the effects that the unique riverine and coastal environment have had upon historic social and economic development in the area (Davis et al. 1979; Wiseman et al. 1979). Cultural ecological approaches appear to guide the majority of research in the state, and an emphasis upon man-land relationships is stressed by most researchers in the field.

All of the sites discovered during the project may be evaluated with respect to criterion "d". WP3-1 is a modern trash dump. As such it is considered to have no potential value for historic archeology in Louisiana and is not eligible for inclusion in the National Register. Additionally, there is no evidence to suggest that WP3-3, the concrete foundation; 16SJ31, the wooden retaining wall; or 16JE137, the fragmentary wooden hull, preserve sufficient useful scientific data to warrant further archeological investigation or nomination to the National Register.

16JE136 is a brick and artifact scatter located along the bank of the Mississippi River. The site does appear to contain a possible mid-19th century component based upon a few artifacts recovered from the riverbank. The visible brick scatter may represent the remains of a structure, but if so, it has been largely or entirely destroyed by erosion of the riverbank. In view of the prevalent occurrence of dumps of construction debris and other artifacts within the batture at Kenner Revetment, it is considered equally likely that brick rubble at the site may represent the eroding remains of an isolated trash dump. In either event, the site lacks demonstrable integrity, and further investigation of the site is not recommended. Based upon available information 16JE136 is not considered eligible to the National Register of Historic Places.

In summary, none of the five historic sites discovered during this survey is considered to be eligible to the National Register of Historic Places, and further investigation is not recommended. On the basis of the research conducted for this study, Iroquois Research Institute finds no reason that the construction projects at Willow Bend, Waterford, Montz, Kenner, Marchand, and Convent should not be implemented as planned.

All of the survey areas have been subjected to recent episodes of overbank deposition that may have buried historic and late prehistoric occupations. In addition, earlier cultural remains may lie buried as deeply as 20 to 30 feet in the Marchand, Convent, Willow Bend, Montz, and Kenner areas. For the most part, the construction of revetments and the enlargement of the Convent Levee should not adversely affect most deeply buried cultural resources, and may in fact act to preserve others. Any deep excavation, however, should be monitored to avoid possible destruction to significant buried cultural deposits. Should any buried remains be encountered, it is recommended that work be stopped and the appropriate state agencies be promptly notified.

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- 1847 Library of Congress Map Division. Coast Directory. Charles J. Pike. Scale not given.
- 1851 National Archives. Center for Cartographic and Architectural Archives. Record group 77. Plan of Levee Ward and Draining District No. 1. Scale not given.
- 1853 National Archives. Center for Cartographic and Architectural Archives. Record group: General Reference, Map of Louisiana. G. W. R. Bayley. Scale not given.
- 1853 New Orleans Public Library. Louisiana Division. Reference Map of the State of Louisiana...also the plantations. John La Tourrette. Scale not given.
- 1858 Library of Congress Map Division. Plantations on the Mississippi River from Natchez to New Orleans. Reproduction from Persac's map, called Norman's Chart, by Rand McNally for Peligan Book Shop, 1931. Scale: one inch to circa two miles.
- 1859 National Archives. Center for Cartographic and Architectural Archives. Record group: Reference Collection. Map of Louisiana. William J. McCulloch. Scale not given.
- 1864 National Archives. Center for Cartographic and Architectural Archives. Record group 77. Proposed Fortification at English Turn. J. Deutsch. Scale: 1 inch to 50 feet.
- 1866 National Archives. Center for Cartographic and Architectural Archives. Record group: Reference Collection. Map of Louisiana. Joseph Gorlinski. Scale not given.
- 1874 National Archives. Center for Cartographic and Architectural Archives. Record group 77. Map of a Reconnaissance of the Mississippi River from Cairo, Illinois to New Orleans, Louisiana. Major Charles R. Suter, Corps of Engineers, U. S. Army. Scale: 1 inch to 1 mile.
- 1879 National Archives. Center for Cartographic and Architectural Archives. Record group 49. Map of State of Louisiana. C. Roeser. Scale: 1 inch to 14 miles.
- circa 1880 Tulane University. Louisiana Collection, Tulane Library. Map illustrating the topography of New Orleans and of the Coast of Louisiana and Mississippi. T. S. Hardee. Scale not given.

- circa
1890 Tulane University. Louisiana Collection, Tulane Library. Map of the City of New Orleans. Prepared for Jewell's Crescent City Illustrated. Scale not given.
- 1897 National Archives. Center for Cartographic and Architectural Archives. Record group 77. Map of Mississippi River, Louisiana. Brigadier General John M. Wilson, U. S. Army Chief of Engineers. Scale: 1:10,000.
- 1916 National Archives. Center for Cartographic and Architectural Archives. Record group 49. State of Louisiana. I. P. Berthrong. Scale: 1 inch to 12 miles.

APPENDIX A

Cartographic Review

In order to evaluate the potential for discovering cultural resource sites within the project areas, map collections were examined at the following repositories: National Archives Center for Cartographic and Architectural Archives; the Library of Congress Geography and Maps Division; the Bureau of Land Management; the U.S. Army Corps of Engineers, New Orleans District Library; the Louisiana Collection at the Tulane University Library; the Louisiana Division of the New Orleans Public Library; the Louisiana Historical Center at the Louisiana State Museum in New Orleans; and the Curatorial Department of the Historic New Orleans Collection. Quadrangle maps were obtained from the U.S. Geological Survey. The purpose of the cartographic review is to obtain data on historic land use and settlement and to provide locational verification and general dating for historic features identified during the field investigations.

Most of the cartographic collections examined contain Louisiana regional maps published during the 18th, 19th and 20th centuries. With a few exceptions, these maps were found to be insufficiently detailed to accurately depict individual cultural features within the vicinity of the Willow Bend, Marchand, Montz, Waterford, and Kenner Revetments as well as the Convent Levee Enlargement and Borrow area.

This cartographic review is based upon three sources of information: the early plat maps on file at the Bureau of Land Management; Mississippi River Commission charts obtained either at the U.S. Army Corps of Engineers, New Orleans District or the Louisiana Collection of the Tulane University Library; and quadrangle maps obtained at the U.S. Geological Survey. A complete listing of all maps and charts consulted for this project can be found in Sources Consulted of the bibliography of this report.

A number of factors exist which hamper the completely accurate identification and location of historic cultural features in and near the survey areas. Differing map scales and degrees of detail often make the accurate location of cultural features with respect to the present survey areas difficult. This problem is exacerbated by the occasionally extensive migrations of the Mississippi River channel during the historic period. Finally, as a result of chronological gaps among the detailed maps, cartographic information is lacking for significant periods of time.

Willow Bend Revetment, M-141-R

Plat Map Township 12 South Range 18 East, South Eastern District of Louisiana, December 23, 1837. No scale is given. This plat map shows survey lines of Section 8, 9, 10, and 11 crossing the project area.

<u>Section</u>	<u>Acres</u>	<u>Claimant</u>
8	209.23	Teuve Roderick
9	302.56	Antoine Borne
10	137.30	Antoine Weber
11	341.74	Adam or Andre Weber

No other pertinent cultural features are depicted on this plat.

Chart 72, "Survey of the Mississippi River," Mississippi River Commission 1895. The scale is 1:20,000. This map depicts a levee abutting the project area, together with two small structures and a borrow pit on the batture inside the project area. Immediately outside the project area appear secondary roads, houses and outbuildings associated with the Wego Plantation operated by A.W. and J.A. Stevenson, as well as farm sheds operated by Jack Strange, Amiel Burke, Joseph Fauchaux, and F. Haydel.

Fifteen minute quadrangle map, "Mount Airy, Louisiana," 1962. This map was prepared and edited by the Mississippi River Commission and published by the Geological Survey. The scale is 1:62,500. The map depicts a levee abutting the project area with a medium-duty road paralleling the levee on its landside. A cemetery, together with two churches, a school and houses, appear in Section 9 immediately outside the project area; several houses also appear in Sections 8, 10 and 11 immediately outside the project area. Inside the project area, a short, unimproved dirt road perpendicular to the river crosses the batture. A navigation light is situated directly east of this cultural feature, at the river's edge.

Convent Levee Enlargement and Borrow Area, M-163-L and M-157-L

Plat Map Township 12 South Range 4 East, South Eastern District of Louisiana, St. Helena Meridian, February 15, 1831. No scale is given. This plat shows survey lines of Section 3 through 21 and Section 26 and 73 crossing the two project areas.

<u>Section</u>	<u>Acres</u>	<u>Claimants</u>
3	94.73	Charles Thibodeaux
4	161.02	John Thibodeaux
5	95.32	Pierre Blanchard
6	117.86	Pierre Michel
7	67.26	Bazile Thibodeaux
8	31.02	Joseph Thibodeaux
9	31.02	Paul Thibodeaux
10	27.92	Peter Beonel
11	157.56	Joseph Landry
12	56.32	Joseph Landry
13	135.72	Charles Bertard
14	67.95	Paul Pertuit
15	70.47	Joseph Callort
16	35.00	Joseph Michel
17	138.00	Louis Gregorie
18	68.05	Fillette Choptranche
19	77.82	Pierre Houbre
20	109.53	Jacques Callonit
21	108.46	Emall Bartion
26	33.49	Pierre Guidry
73	33.50	Alex Guidry

No other pertinent cultural features are depicted on this plat.

Plat Map Township 12 South Range 4 East, South Eastern District of Louisiana, St. Helena Meridian, August 14, 1850. No scale is given. This plat shows survey lines of Sections 3 through 21 and Sections 26 and 73 crossing the two project areas.

<u>Section</u>	<u>Acres</u>	<u>Claimants</u>
3	169	Pierre Myre
4	243	Charles Thibodeaux Jr.
5	82.40	Pierre Blanchard
6	59.24	Manuel Breaux
7	59.06	Pierre Michel Jr.
8	164.62	Charles and Olivier Thibodeau
9	44.30	Louis Nicot
10	24.70	Dr. Desmarest
11	192.62	Les Dames Du Sacre Coeur
12	67.22	Joseph Landry
13	121.68	Charles Bertrand
14	55.92	Jacques Graber
15	60.00	Paul Pertuit
16	81.64	Joseph Caillet
17	28.00	Joseph Michel
18	123.72	Louis Gregoire
19	72.10	Pierre Houvre
20	84.80	Joseph Callouet
21	87.44	Joseph Calliot
26	40.14	Pierre Guedry
73	not given	Simon Richard

No other pertinent cultural features are depicted on this plat.

Chart 71, "Survey of the Mississippi River," Mississippi River Commission, 1895. The scale is 1:20,000. This map depicts a levee abutting the project area, together with numerous houses and St. Michael's Church within Sections 3 through 21 immediately outside the project area. Also, the Sacred Heart Convent appears north of St. Michael's Church, while south of this church appears a race track.

The landowners identified immediately outside the project area include T.H. Brand and Dr. Dellates.

Seven and a half minute quadrangle map, "Convent, Louisiana," 1962. This map was prepared and published by the Geological Survey. The scale is 1:24,000. The map depicts a levee abutting the project area with a medium-duty road paralleling the levee on its landside. Numerous houses, several churches, a school and a cemetery appear in the town of Convent within Sections 3 through 21 immediately outside the project area. Inside the project area, a short, unimproved dirt road crosses the batture in Sections 5 and 6. The Convent and race track observed on item 3, Chart 71, no longer appear on this map.

Marchand Revetments, M-181-L

Chart No. 69, "Survey of the Mississippi River," Mississippi River Commission, 1895. The scale is 1:20,000. This map depicts a levee abutting both of the project areas, together with plantations on the landside immediately outside the project areas belonging to Mrs. Landry on the upper river revetment, and J. Marchand on the downriver revetment. What appears to be the remains of a broken levee is observable in the project area of both revetments, between the river and the continuous levee. Also, a navigation light appears at the river's edge in the project area of the upriver revetment.

Fifteen minute quadrangle map, "White Castle, Louisiana," 1963. This map was compiled and edited by the Mississippi River Commission and published by the U.S. Geological Survey. The scale is 1:62,500. The map depicts a levee abutting the project area of the downriver revetment, together with what appears to be a broken levee between the river and the continuous levee. A medium-duty road parallels the continuous levee on its landside. Several dwellings appear immediately outside the downriver revetment project area in Sections 37 and 38.

Fifteen minute quadrangle map, "Donaldsonville, Louisiana," 1965. This map was prepared, edited and published by the U.S. Army Engineer District, New Orleans, Corps of Engineers. The scale is 1:62,500. The map depicts a levee abutting the project area of the upriver revetment, together with a medium-duty road paralleling the levee on its landside. A number of dwellings and gas or oil wells appear in Sections 30 and 31 immediately outside the project area of the upriver revetment. What appears to be the remains of a broken levee are observable in the project area of the upriver revetment between the river and the continuous levee.

Montz Revetment, M-129.5-L

Plat map Township 12 South Range 7 East, South Eastern District of Louisiana, St. Helena Meridian, May 18, 1848. No scale is given. This plat shows survey lines of Sections 8, 9, 10, and 11 crossing the project area.

<u>Section</u>	<u>Acres</u>	<u>Claimant</u>
8	28.66	Madam Grondel
9	45.90	Francois Saulet
10	65.27	F. J. Delhomme
11	273.07	Madam Trepagnier

No other pertinent cultural features are depicted.

Charts 73 and 74, "Survey of the Mississippi River," Mississippi River Commission, 1895. The scale is 1:20,000. This map depicts a levee abutting the project area, together with about one dozen houses and outbuildings associated with small farmsteads immediately outside the project area.

Seven and a half minute quadrangle map, "Laplace, Louisiana," 1967. This quad was mapped, edited and published by the U.S. Geological Survey. The scale is 1:24,000. The map depicts a levee abutting the project area, together with a heavy-duty road paralleling the levee on its landside. A number of dwellings and what probably is a power transmission tower appear in Sections 8 and 9 immediately outside the project area. Buildings, outbuildings, roads and fences associated with a powerplant appear in Section 11 immediately outside the project area. A power transmission line crosses the river and the batture in the project area, going to the power transmission tower situated outside the project area in Section 9.

Waterford Revetment, M-128-R

Plat Map Township 12 South Range 20 East, July 7, 1829. No scale is given. This plat shows survey lines of Sections 17, 20, 21, 22, 23, and 24 crossing the project area, together with Sections 18 and 19 also crossing the project area in 1829.

<u>Section</u>	<u>Acres</u>	<u>Claimants</u>
17	78.40	Madam Brow
18	41.30	Abrm. Bergron
19	35.40	Madam Tusanne
20	49.60	Adolph Darensbourg
21	36.60	Charles Perret
22	75.90	Charles Perret Jr.
23	82.80	Andrew Rixner
24	113.10	Madam Vougin

No other pertinent cultural features are depicted.

Plat Map Township 12 and 13 South Range 20 East, South Eastern Louisiana, October 23, 1856. No scale is given. This plat shows survey lines of Sections 17, 20, 21, 22, 23 and 24 crossing the project area.

<u>Section</u>	<u>Acres</u>	<u>Claimants</u>
17	148.32	Widow Bourgeois
20	70.28	Abram Bourgeois
21	37.54	C. Perret
22	76.86	Charles Perret Jr.
23	80.18	Mrs. Brou
24	109.56	Widow Vaugine Darensbourg

No other pertinent cultural features are depicted.

Chart 74, "Survey of the Mississippi River," Mississippi River Commission, 1895. The scale is 1:20,000. This map depicts a levee abutting the project area, together with two outbuildings atop the batture inside the project area. Outside the project area, but close to it, appear two or three houses and assorted outbuildings belonging to the Waterford and Kilona Sugar Cane Plantations operated by R. Millikin.

Fifteen minute quadrangle map, "Hahnville, Louisiana," 1969. This quad was mapped, edited and published by the U.S. Army Engineer District, New Orleans. The scale is 1:62,500. The map depicts a levee abutting the project area, together with a hard surface, medium duty road paralleling the levee on its land side. What appears to be the remains of a broken levee is observable in the project area between the river and the continuous levee. A navigation light also appears at the river's edge in the project area. Houses and outbuildings, a cemetery, a powerhouse substation, and an industrial waste facility appear in Sections 17, 20, 21, 22, 23 and 24 immediately outside the project area.

Kenner Revetment, M-113-L

Plat Map Township 11, 12, and 13 South Range 10 East, South Eastern District of Louisiana, St. Helena Meridian, no date, circa 1854. No scale is given. This plat shows survey lines of Section 39 in Township 12 South Range 10 East and Sections 37, 38, and 39 in Township 13 South Range 10 East crossing the project area.

<u>Section</u>	<u>Acres</u>	<u>Claimant</u>
39 of T12S R10E	1,799.89	Heirs of Pierre Sauve
37	348.12	Heirs of Pierre Sauve
38	433.18	Pierre and Ursin Soniat
		Dufossat and Beausejour
		Boisblanc
39	650.63	Bernard Marigny

No other pertinent cultural features are depicted.

Chart No. 75, "Survey of the Mississippi River," Mississippi River Commission, 1895. The scale is 1:20,000. This map depicts a levee abutting the project area, together with portions of another levee and a navigation light inside the project area of Section 39, Township 12 South Range 10 East. What appears to be a water-filled borrow is depicted inside the project area of Section 38, Township 13 South Range 10 East. Immediately outside the project area appear buildings and secondary roads associated with plantations abutting the project area identified from upriver to downriver as follows: Trudeau Plantation operated by John Cleary; Providence Plantation operated by V. Fortier; Boisblanc Plantation operated by Simon Orsley and others; and the Soniat Plantation. Rice is identified as the crop raised on the latter plantation.

Seven and a half minute quadrangle map, "New Orleans West, Louisiana," 1965, photorevised 1972. This map was prepared, edited and published by the U.S. Geological Survey. The scale is 1:24,000. The map depicts a levee abutting the project area, together with a light-duty road atop the levee. A navigation light appears on the levee in Section 39 of Township 12 South Range 10 East. Roads, churches, houses, schools, and shopping centers appear immediately outside the project area in Section 39 of Township 12 South Range 10 East and in Sections 37, 38, and 39 in Township 13 South Range 10 East. An unimproved dirt road crosses the batture in the project area in Section 38 of Township 13 South Range 10 East.

APPENDIX B

ABOUT THE AUTHORS AND CONTRIBUTORS

Iroquois Research Institute is one of the most active private research centers for archeological and historical investigations in North America. The Institute has attracted a highly skilled staff organized in the research services of Anthropology, History, Architecture, and Environment and Engineering. In addition to the full time staff, visiting scholars are invited to participate in specialized and complex research projects.

Cecil Brooks, Senior Environmental Analyst, received his Ph.D. in Plant and Soils Science from Texas A & M in 1966. He has been the principal investigator for plant and soil science studies and for environmental inventories of study areas throughout the United States: Alaska, California, Utah, Kansas, Missouri, Texas, Arkansas, Louisiana, Tennessee, Kentucky, Virginia, Maryland, and the District of Columbia. Dr. Brooks has valuable experience in participating in complex interdisciplinary programs and is co-author of several recent cultural resource reports.

William E. Duncan, Archeologist, received his B.A. in Anthropology in 1977 from the University of Maryland. He has experience in both historic and prehistoric excavations and has participated in reconnaissance surveys in Maryland and Louisiana.

Douglas H. Edsall, Geologist, received a Ph.D. in Marine Geology from Columbia University in 1975. Dr. Edsall is experienced as a marine geologist, geomorphologist, environmental scientist, and forensic geologist. He is certified by the Association of Professional Geological Scientists, #3990. He has performed as principal investigator of fluvial features, geological formations and their chronological association with cultural features. He is a tenured professor in the Department of Environmental Sciences at the United States Naval Academy.

Patricia B. Eggleston, Historian, received her Ph.D. in History from the University of Alabama in 1980. Dr. Eggleston has completed several history assignments for cultural resource projects and is experienced in assisting historic archeologists in defining research objectives and commensurate field methodologies.

Adam G. Garson, Senior Archeologist, received his Ph.D. in Anthropology from Yale University in 1980. Dr. Garson is experienced in research design, project management and administration. He has conducted excavations, surveys, and research in New York, Connecticut, Maryland, Arizona, Louisiana, the West Indies, and Venezuela. Dr. Garson is skilled in artifact analysis, ecological studies, statistical methods, and computer programming.

John D. Hartley, Principal Investigator, is currently A.B.D. in Anthropology at Tulane University, where he has specialized in North American archeology. The University of Oklahoma awarded him an M.A. in Anthropology in 1974. He has been involved in cultural resource management projects since 1971, working his way up from laboratory assistant and crew member to crew chief, and then to field director and project archeologist. His archeological experience is in Kansas, Missouri, Oklahoma, Louisiana, Virginia, and Central America. His skills include historical and archival research and lithic and ceramic analysis.

Kenneth R. Jones, Archeologist, received his B.A. in Anthropology from the University of Pennsylvania in 1973 and is currently a doctoral candidate at Tulane University. He has extensive experience in survey, test operations and excavation in Pennsylvania, Arizona, Tennessee, Louisiana, Alabama, Mexico and Guatemala.

Christine I. Micale, Cartographer and Graphics Illustrator, has been schooled in art history, drawing and design and is experienced as a technical illustrator and graphic artist. She supervises the production of graphics, charts, art diagrams, and line work for Institute environmental and cultural resource reports.

Thomas H. Ray, Historian, received his Ph.D. in History from the University of Colorado in 1974. He conducts oral history interviews and prepares documented reports conveying the political, military, economic, social and cultural aspects of U.S. local and regional history. These historical reports are based upon extensive research at national, regional and local repositories. A professional historian for more than 20 years, Dr. Ray is the author of official histories, monographs, historical analyses, and reports for various governmental agencies. He also served as an archivist at the National Archives for five years.

Eugenia J. Robinson, Archeologist, is currently A.B.D. in Anthropology at Tulane University and has extensive field experience in both survey and excavation in the northeastern United States and Louisiana, Guatemala, Mexico and Honduras. She is also experienced in illustration, drafting, computer and statistics.

Leslie P. Smith, Archeologist, received her B.A. in Anthropology from the University of California at Santa Barbara in 1975. She is currently a doctoral candidate at Tulane University. She has surveying and excavation experience in southeastern United States, California and Mesoamerica.

Rhonda Steppe, Archeologist, received her B.A. in Anthropology from The George Washington University in 1980. She is experienced in historical and archival research, archeological surveying and excavation, museum specimen preparation and photographic darkroom techniques. She has assisted in field operations in Maryland, Virginia and Louisiana.

Mary Lou Vanzin, Archeologist and Laboratory Analyst, is currently completing a thesis for a master's degree in Archeology from the University of Pittsburgh. She has a range of experience in various types of artifact analysis including lithic, ceramic and shell remains. Ms. Vanzin has also participated in the curation and preservation of cultural collections and has analyzed both micro-and macro-floral and faunal remains. She has been supervisor of archeological surveys in Ohio, Illinois and Virginia, and participated in survey, test operations, and excavation in Pennsylvania, Colorado, Arkansas, and Louisiana.

Paula Zitzler, Archeologist, received her B.A. in Anthropology in 1977 from Indiana University of Pennsylvania. She is experienced in archeological survey, testing, and excavation for both historic and prehistoric sites. She is also experienced in artifact curation and cartography. Ms. Zitzler has participated in survey and test operations in New York, Pennsylvania, Arkansas, Missouri, Connecticut and Virginia, and has conducted a background search for interpreting archeological data in Louisiana.

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